THE FOUNDRY

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They Know LINOIL

The Men of Osgood, like a gr many other good foundrym have reached the conclusion t big cores are more economical the long run and are genera much more satisfactory wh made with all-oil sand, providi of course a reliable oil like Lin is used. Much, but not all, of t work of the three Osgood fou ries is heavy castings.

3-TON LINOIL CORE USED

The 4′ 4″ casting on this page was made in green sand in a 3-part mold with a 3-ton Linoil core. Notice the 1-ft ruler placed inside the pipe.

Castings on opposite page are cable drums for power shovels, hoists, etc. They are 7 feet long and 44 inches in diameter, made in dry sand inside and out—Linoil sand.

THE WERNER G.

(DIVISION OF ARCHER

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Warehouse

Canada—WERNER G. SMITH, Ltd.

Factory and Offic

What they Know, these USERS OF AMERICA

better use

LINOIL

the logical oil

Here is

THE OSGOOD COMPANY

MARION, OHIO

using Linoil year in and year out in all three foundries, Grey Iron Foundry, The Commercial Steel Co., and The Alloy Cast Steel Co.

Sam Cunningham, Sup't Grey Iron

nows, and knows he nows, Linoil—

It's a grand oil," says Sam, It's got everything a core oil hould have, and (he emphaizes the "and") it is always niform!" **BETTER USE LINOIL.**

SMITH COMPANY

ANIELS - MIDLAND COMPANY)

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134 Royce Ave.

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Faster

Cleaning Breaks "Bottlenecks"

If you are on the "spot"—with staggering production requirements you can't meet because of delays and hold-ups in your cleaning department—see *Pangborn at once.* BECAUSE—Pangborn *specializes* in blast cleaning application and engineering—knows all the possibilities for improved operation and production by having been the acknowledged leader in designing, building and servicing this type of equipment for more than thirty-six years.

It takes ALL KINDS of Blast Cleaning equipment—AIR and AIRLESS methods—to clean today's production requirements EFFICIENTLY (quickly, accurately, uniformly, without rejects, without breakage) and ECONOMICALLY (at lowest possible dollar cost per ton cleaned).

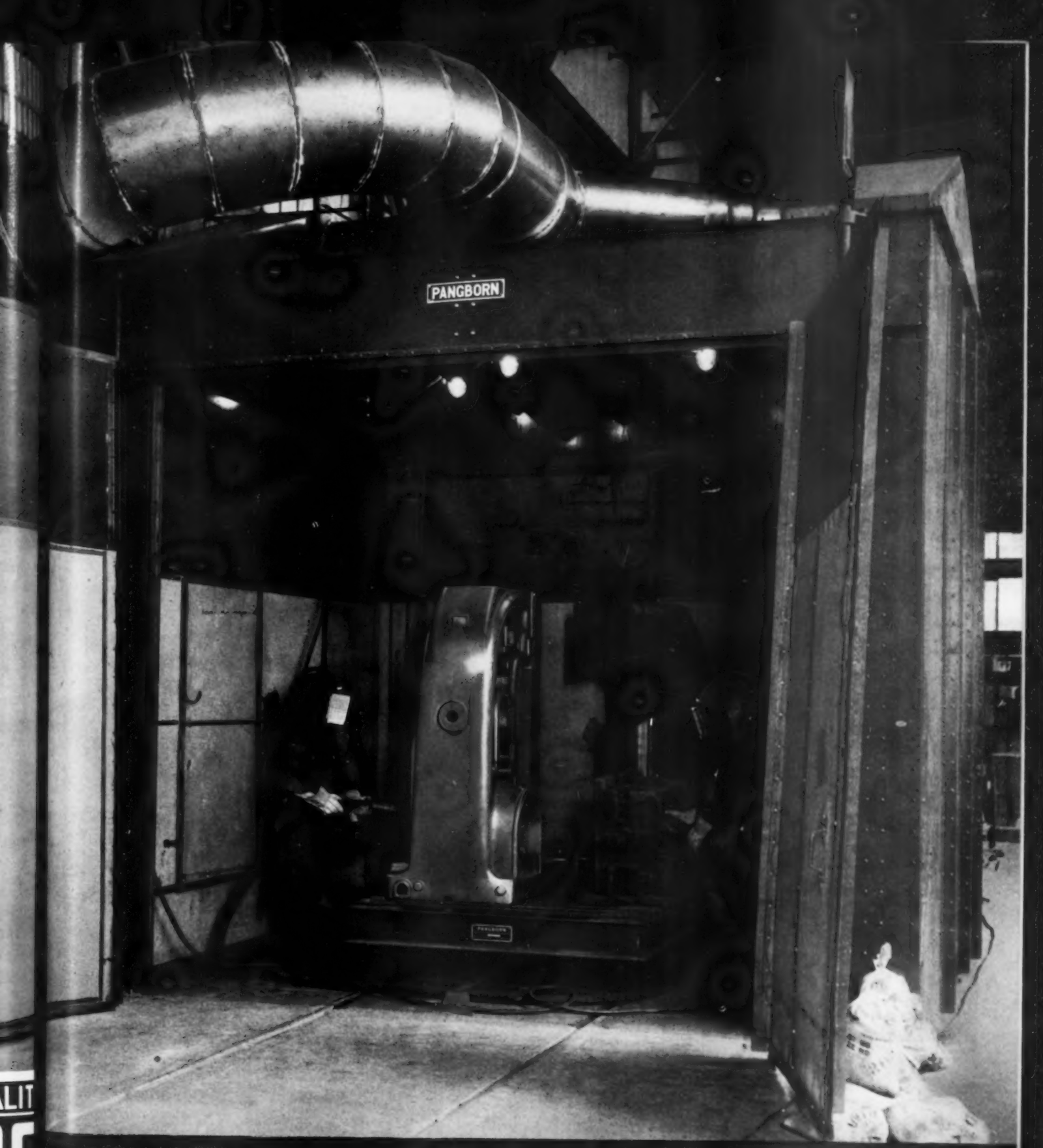
Pangborn Air Blast ROOMS and CABINETS are working overtime today as foundries everywhere contribute to Defense. Pangborn Airless ROTOBLAST BARRELS and TABLES are turning out tons of work, shift after shift, at increased speeds and lower costs to the satisfaction of both management and operators.

If YOU are on the "spot"—trying to increase your finished foundry production—you'll be satisfactorily surprised at what PANGBORN can do for you. No obligation, of course, for performance details. Just wire or write today. Engineers in every section of the metal working fields.

Typical installation view of large ROTOBLAST Barrel showing samples of work handled.

Medium size Pangborn Blast Room showing both cleaned and uncleaned work on the car between the two operators.

AIRLESS ROTOBLAST BARRELS, TABLES AND SPECIAL MACHINES.
AIR BLAST ROOMS AND CABINETS. ALL STEEL, CLOTH SCREEN, DUST COLLECTORS.



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PANGBORN CORPORATION

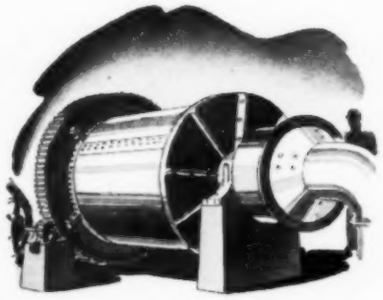
HAGERSTOWN · · MARYLAND

NORTH AMERICAN
for COMBUSTION

NORTH AMERICAN
MANUFACTURING COMPANY
CLEVELAND, OHIO

Chromium-Iron Grinding Balls

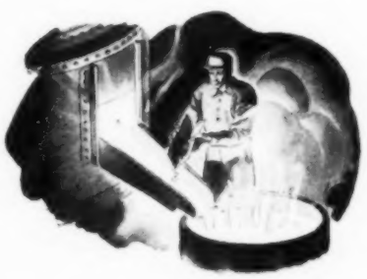
Give Lower-Cost Grinding and Longer Ball Life



Inexpensive! Chromium-iron balls lower the cost of ball mill grinding.

Tough! It took two men with a 16-pound sledge a long time to split them.

Hard! A 4-inch ball containing 1.50% chromium showed over 500 Brinell.



Easy to Make! Add Ferrochrome in the ladle or Briquets in the cupola.

USERS find that cast iron grinding balls containing chromium wear longer and more uniformly, and result in lower ball mill grinding costs.

For instance, one large copper mining company reports that 3 per cent chromium cast iron balls give them a lower grinding cost than any other ball they have tried.

In another case, a foundry tested 3-inch and 4-inch grinding balls, both plain and chromium-bearing, by striking them with a 16-pound sledge hammer. Three blows at the most split the unalloyed balls wide open. The balls which contained from 1.25 to 1.50 per cent chromium, however, withstood the blows of two men, one relieving the other, for a considerable time. When the chromium-bearing balls did finally split, they showed a completely white fracture throughout. The 4-inch ball had a Brinell hardness of 444 in the heart and 535 on the surface.

Chromium Increases Hardness

Another foundry obtained increased hardness and wear-resistance in its grinding balls by adding 0.50 per cent chromium to its 2 to 3-inch balls and 0.80 per cent chromium to its 3 to 4-inch balls. A plain 3½-inch ball showed a hardness of 370 Brinell while a chromium-bearing ball of the same size showed 405 Brinell.

Why not add chromium to your grinding balls? You will get a harder, more abrasion-resistant iron, and even though the balls may cost a little more, your customers will save more than the difference in lower grinding costs.

Chromium up to 1.50 per cent can be easily added in the ladle by the use of Foundry Grade Ferrochrome. In the cupola, the desired chromium content can be obtained with "EM" Chromium Briquets. Ask to have one of our metallurgists call and tell you more about these "Electromet" alloys and their profitable use. Or write for the book "Chromium in Cast Iron," without obligation.

ELECTRO METALLURGICAL COMPANY
Unit of Union Carbide and Carbon Corporation
UCC
30 East 42nd Street, New York, N. Y.

Electromet
Trade Mark
Ferro-Alloys & Metals

Available through offices of Electro Metallurgical Sales Corporation in Birmingham, Chicago, Cleveland, Detroit, New York, Pittsburgh, and San Francisco. In Canada: Electro Metallurgical Company of Canada, Limited, Welland, Ontario.

"Electromet" and "EM" are registered trademarks of Electro Metallurgical Company.

We take this opportunity

of extending to all foundrymen

our sincere good wishes

for a Merry Christmas

and a Happy New Year.

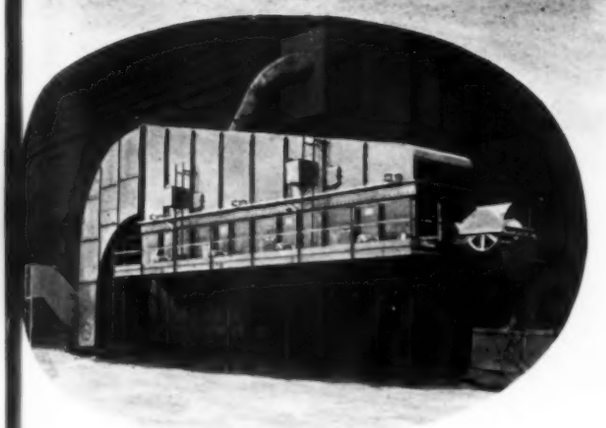
NATIONAL ENGINEERING COMPANY

549 WASHINGTON BLVD., CHICAGO, ILL., U. S. A.

MANUFACTURERS AND SELLING AGENTS FOR CONTINENTAL EUROPEAN COUNTRIES—THE GEORGE FISCHER STEEL & IRON WORKS, SCHAFFHAUSEN, SWITZERLAND
FOR THE BRITISH POSSESSIONS, EXCLUDING CANADA AND AUSTRALIA—AUGUST'S LIMITED, HALIFAX, ENGLAND
FOR CANADA—DOMINION ENGINEERING CO., LTD., MONTREAL, CANADA. FOR AUSTRALIA AND NEW ZEALAND—GIBSON BATTLE & CO., PTY., LTD., SYDNEY, AUSTRALIA

This dust hood is doing "a job that couldn't be done"

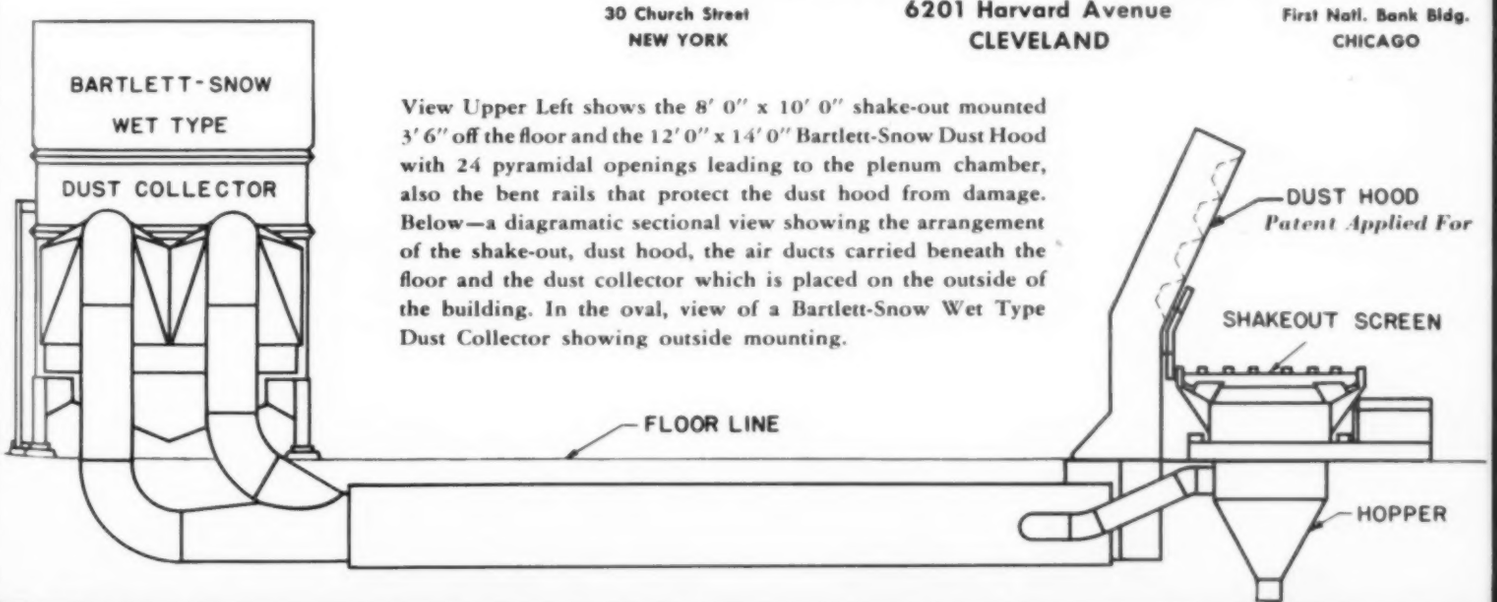
Handles 33,000 Cu. Ft. of Air a Minute to Clean Up an Exceedingly Severe Dust Nuisance



● The dust nuisance resulting from shaking out dry sand molds was so severe in this foundry that the crane operator, who was of necessity directly over the shake-out, had to use a gas mask. It was impossible to see even 10 ft. in any direction when a flask was being shaken out. After other remedies had failed a Bartlett-Snow Side Wall Dust Hood 12′ long by 14′ high, having 24 pyramidal openings into a plenum chamber, and connected to a Bartlett-Snow Wet Type Dust Collector was installed. With this equipment it is possible to shake out flasks 7′ long, 3′ wide and 3′ high on the most distant edge of the shake-out without any visible dust loss whatever, and even to handle flasks 17′ long, 5′ wide and 3′ high with only slight traces of dust loss even though these flasks are 7′ longer than the shake-out itself. We solicit your inquiries. More complete details will be furnished on request.

THE C. O. BARTLETT & SNOW COMPANY

30 Church Street NEW YORK | 6201 Harvard Avenue CLEVELAND | First Natl. Bank Bldg. CHICAGO



View Upper Left shows the 8′ 0″ x 10′ 0″ shake-out mounted 3′ 6″ off the floor and the 12′ 0″ x 14′ 0″ Bartlett-Snow Dust Hood with 24 pyramidal openings leading to the plenum chamber, also the bent rails that protect the dust hood from damage. Below—a diagramatic sectional view showing the arrangement of the shake-out, dust hood, the air ducts carried beneath the floor and the dust collector which is placed on the outside of the building. In the oval, view of a Bartlett-Snow Wet Type Dust Collector showing outside mounting.

BARTLETT-SNOW

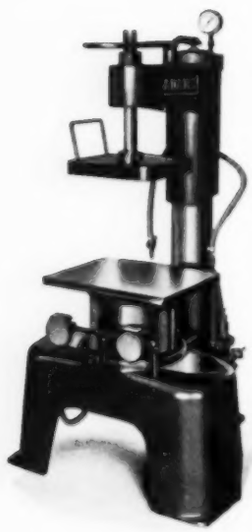
ENGINEERS, DESIGNERS AND FABRICATORS FOR THE FOUNDRY INDUSTRY

Complete Structural, Machine and Plate Fabricating Facilities to Meet Any Requirement

Adams Portable Jolt Squeezer, Side Rod Type

Meet Your Production Demand

with Adams Molding Machines



Adams Stationary Jolt Squeezer, Post Type

Whether the necessity is for increased output or for lower production costs, the problem can be easily and effectively solved by the installation of Adams Molding Machines.

The simplicity of these machines and the convenient location of operating controls eliminate the need for skilled labor, and their design and construction assure continuous dependable performance that quickly repays the small investment.

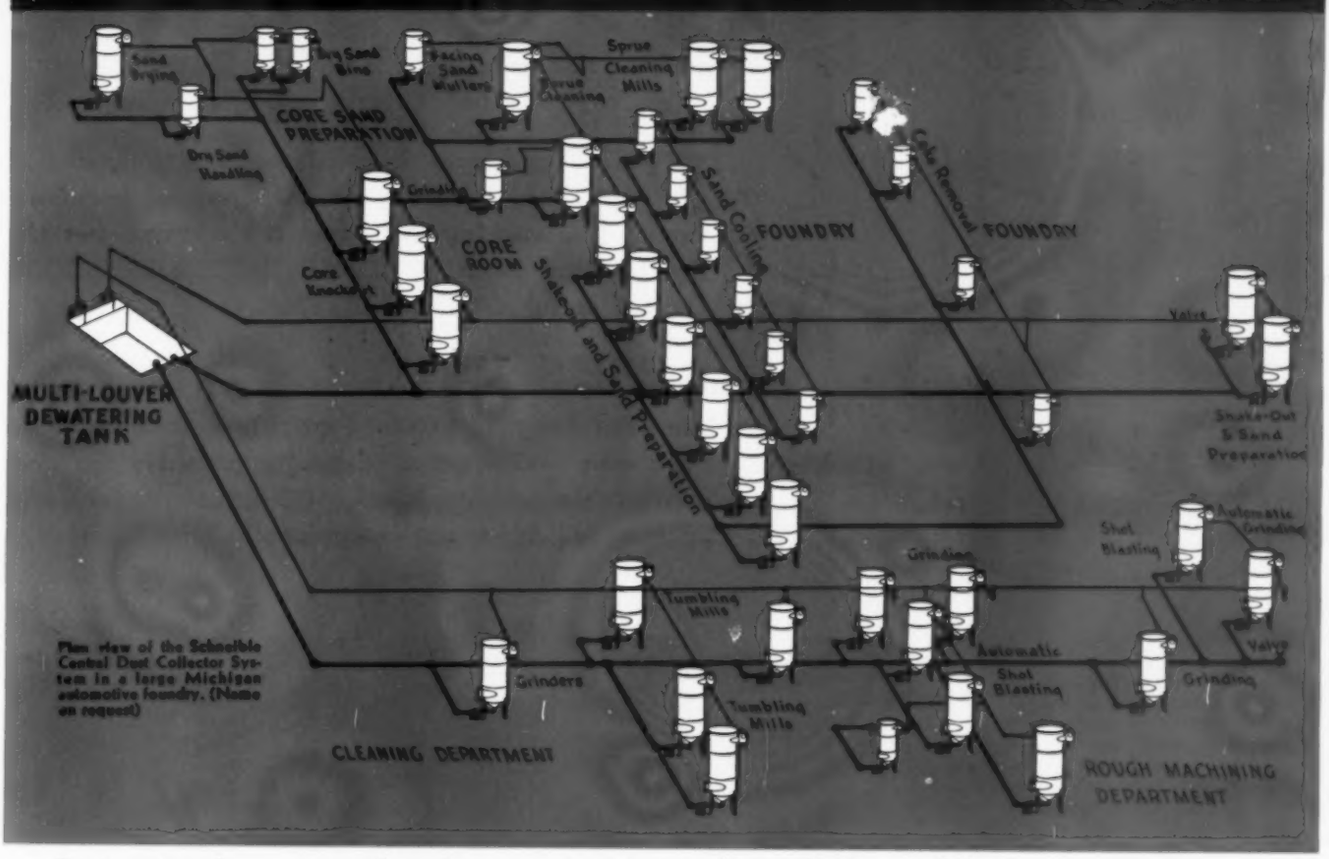
Adams Molding Machines are available in Side Rod Type and Post Type . . . Jolt-Squeeze and Jolt-Squeeze-Pattern-Draw . . . Portable and Stationary . . . in sizes that cover the entire range of squeezer molding.

The Adams Company

1883—Our 57th Year—1940

800 Foster St., Dubuque, Iowa

This Continuous, Automatic Schneible Central System is the *One* Scientific Dust Collection Method!



Plan view of the Schneible Central Dust Collector System in a large Michigan automotive foundry. (Name on request)

Dust arising from various foundry operations is actually washed out of the air and the sludge that results is pumped into a gravity return system to the dewatering tank. The clarified water is recirculated over and over; the settled and dewatered sludge is removed when a sufficient quantity has accumulated. No need for cleaning out dust from each collector—no mess—no bother—nothing to clog, clean or replace—just continuous, efficient, quiet operation from the moment you open the valve and throw the switch.

Schneible Multi-Wash Systems are made for foundries of any size, from the largest—such as the automotive foundry shown—to the smallest.

Send for bulletin explaining why collecting dust and fumes the Schneible Way costs so little.

Schneible Multi-Wash Collectors are made in all sizes from 350 to 30,000 c.f.m. capacity for handling dust, fumes and odors.

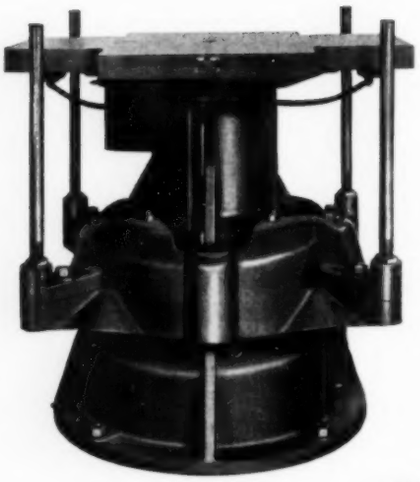
CLAUDE B. SCHNEIBLE CO.

3951 Lawrence Avenue, Chicago, Ill.

Representatives in Principal Cities

SCHNEIBLE

UP GOES EFFICIENCY

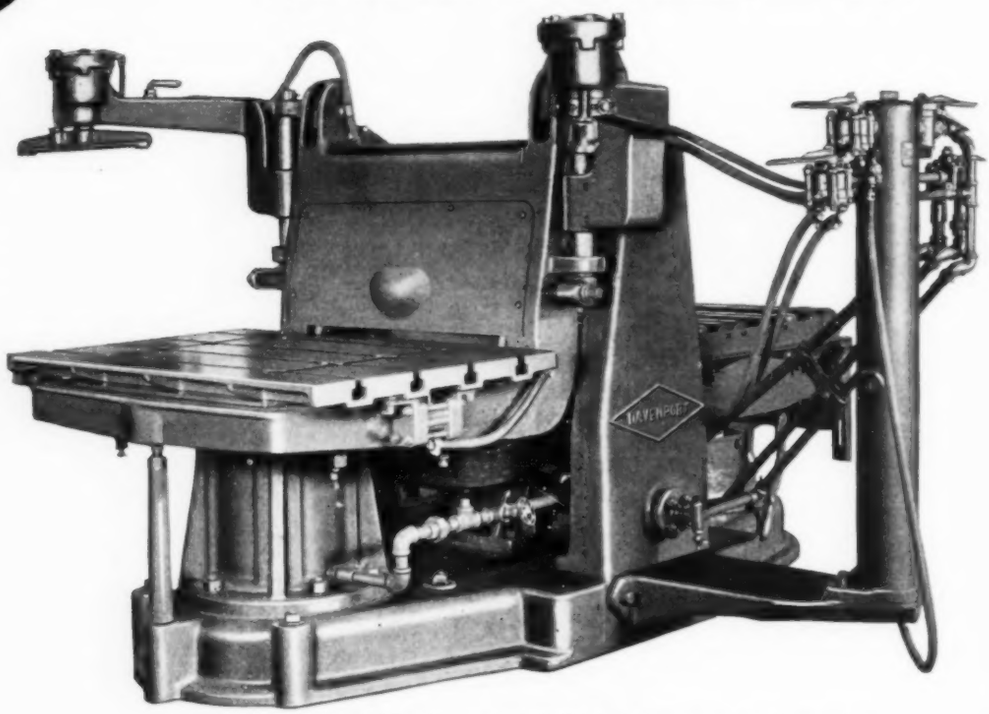


WHEN your molding problems have to do with all types and sizes of patterns, changed frequently during the working day, then it's a sound bet that the solution is MILWAUKEE DAVENPORT ROLL-OVERS and JOLT PIN LIFTERS.

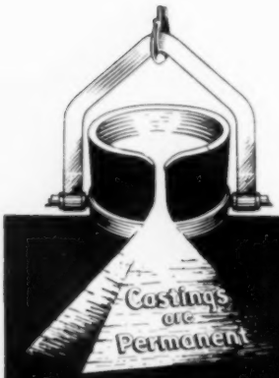
HERE'S WHY

They are designed to adapt quickly to many different flask sizes, with ample capacity provided for every conceivable molding need. (The pattern tables are open-ended for those exceptionally long jobs).

● MODEL S — JOLT PIN LIFTERS — Designed to eliminate squaring shafts, linkages and cranks. A ring shaped piston fitted into the base pushes upward against the solid one piece lifting frame. Four hardened and ground pins coupling the two parts provide precision guiding. A new type of slow draw valve is also featured.



● MODEL SA — JOLT ROLLOVER pattern draw machine. A simple hinge type design with fully enclosed jolt and draw units. Offers full power operation including air operated clamping from manually operated clamping arms. Full oil draw unit for precise control. Will fit ideally into the restricted machinery budget and offers years of satisfactory service.



MILWAUKEE FOUNDRY

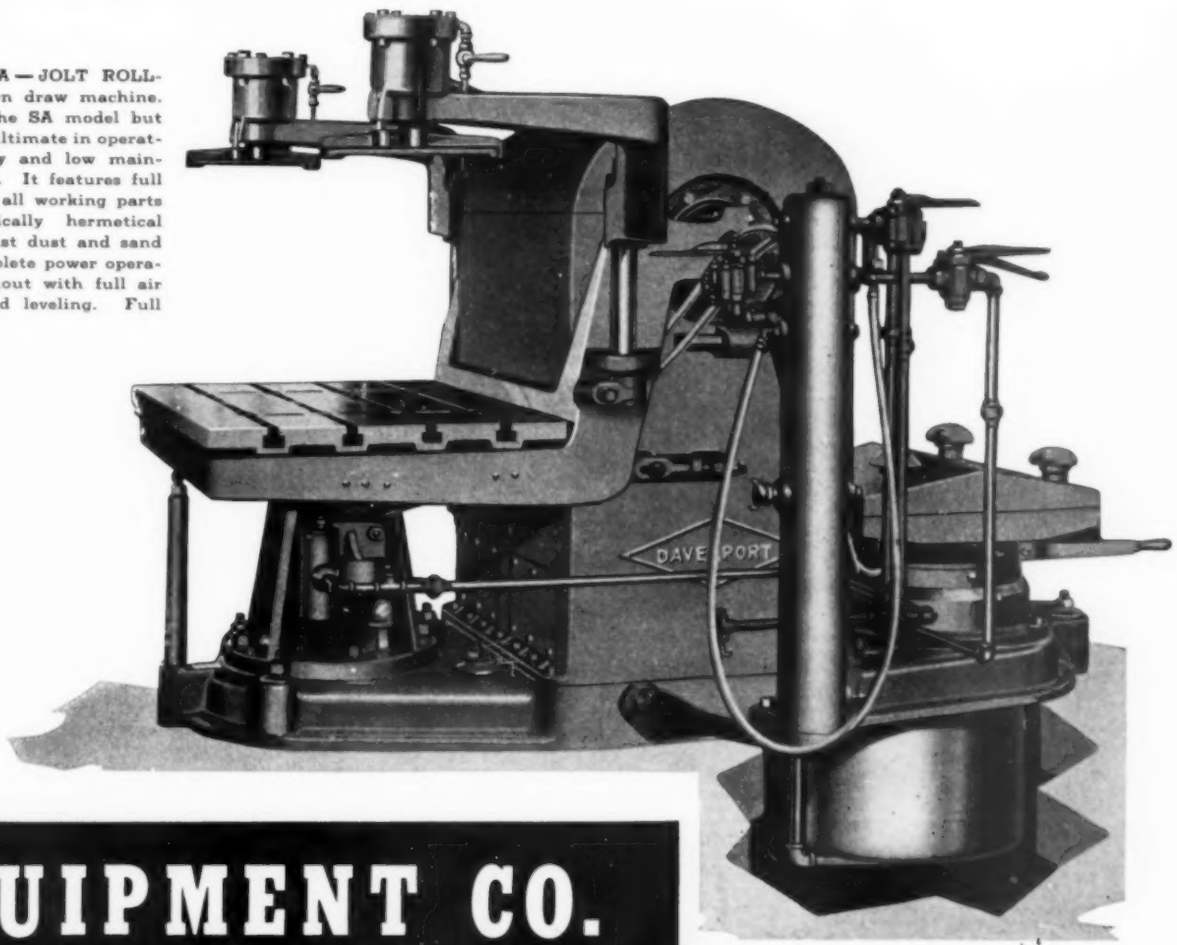
3238 W. PIERCE STREET · Cable Address "MILMOLDCO"

DOWN LOW COST MOLDING GOES MAINTENANCE

They are fundamentally production machines for jobbing work with either inexpensive wooden patterns or the finest of metal equipment. Every practical molding facility has been provided for the speedy production of uniform quality molds.

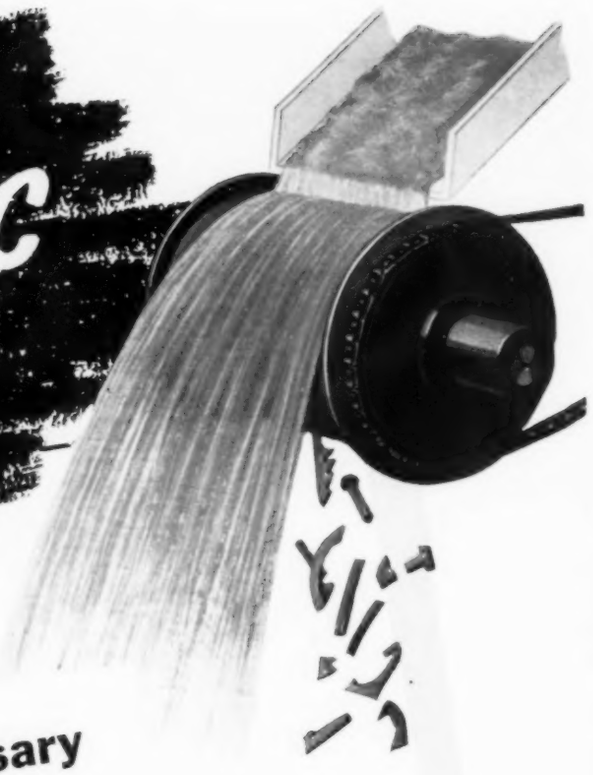
They will eliminate the irritating and costly production interruptions occasioned by frequent breakdowns. A quarter century of constant engineering effort has been devoted to increasing their useful working life.

● MODEL A — JOLT ROLL-OVER pattern draw machine. Similar to the SA model but offering the ultimate in operating efficiency and low maintenance cost. It features full enclosure of all working parts with practically hermetical sealing against dust and sand entry. Complete power operation throughout with full air clamping and leveling. Full oil draw.



EQUIPMENT CO.
MILWAUKEE · WISCONSIN · U. S. A.

DINGS MAGNETIC DRUMS



to remove iron from foundry sand . . . no conveyor belts necessary

DINGS High Intensity Magnetic Drums are designed to remove iron from foundry sand when it is impractical to carry it on a conveyor belt and pass it over a magnetic pulley. These separators, consisting of powerful magnetic coils surrounded by a revolving tubular shell meet all demands for an economical stationary installation with sufficient capacity to handle large quantities of sand per hour, and enough power to extract all the iron.

A large automotive foundry recently installed three Dings Magnetic Drums with outstanding success after finding that pulleys or pulley type separators would be impractical for the following reasons: hot sand would make belting costs excessive; their handling setup includes an apron conveyor which they did not wish to remove as would otherwise have been necessary.

The drums installed in this plant are removing everything from fine shot up to 6" chunks of iron. The drum coils are wound with glass covered wire to resist heat and for strength and the shells are made of stainless steel to resist abrasive action of the sand.

What conditions must be met by a separator in your plant? Write to Dings today for complete details on the unit that will meet your individual needs.

Illustrating the principle of operation of the Magnetic Drum. Sand passes over drum in normal trajectory while iron is attracted and held to revolving shell until it passes underneath and out of magnetic field where it is discharged.

DINGS MAGNETIC SEPARATOR CO.
MILWAUKEE, WIS.

675 SMITH STREET

Complete line of magnetic separators for removing iron from sand, slag, refuse and for separating ferrous and non-ferrous scrap. High Intensity Lifting Magnets for economical metal handling.

Dings MAGNETIC SEPARATION HIGH INTENSITY

GREAT LAKES

DRY SAND

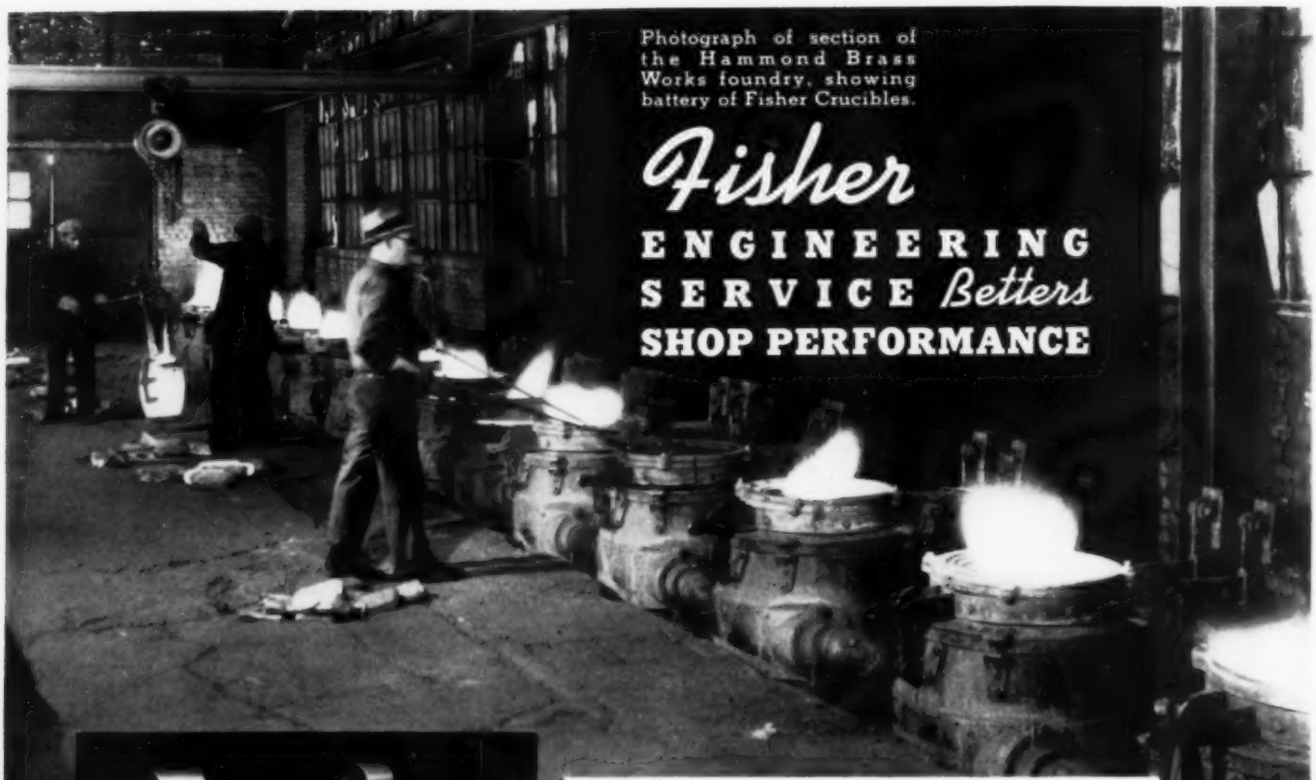
Molding Sands
Juniata Bank Sands
Lake Core Sands
Ottawa Silica Sands
Diamond Blast Sand
Flint Shot Blast Sand
Gold Jacket Blast Sand
Gem Quartz Blast Sand
Muscatine Blast Sand
Steel Shot & Grit
Blasting Nozzles (Stoody)
Bentonite (Volclay)
Rebonding Clays
Refracto Fire Clays
Great Lakes Coroil
A.B.C. Foundry Coke
Firestone (Sawed & Rough)
Mica Schist—Grits
Ganister (Firegan)
Limestone—Dolomite
Nepheline Syenite
De-Sul-Flux

Great Lakes offers the following thoroughly dried, accurately graded sands, all year 'round—Juniata Bank Sands; Ottawa and New Jersey White Silica Sands; Wisconsin and Ohio Silica Sands and Gallia, Ohio Molding Sand. • These sands are shipped in paper-lined box cars so as to insure arrival at your plant ready for use. • Great Lakes will be glad to have an experienced sand specialist who is also a practical foundryman consult with you regarding your requirements.

Great Lakes Foundry Sand Co.

UNITED ARTISTS BUILDING
DETROIT, MICH.

MINERS—PROCESSORS—FOUNDRY, METALLURGICAL AND SAND BLAST SERVICE



Photograph of section of the Hammond Brass Works foundry, showing battery of Fisher Crucibles.

Fisher
ENGINEERING SERVICE *Betters* SHOP PERFORMANCE

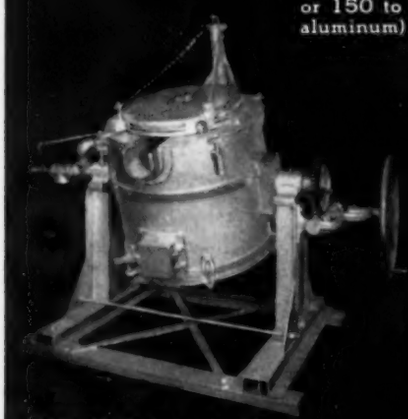
FISHER MOTORIZED NOSE POUR CRUCIBLE
Oil or gas fired. No. 150 to No. 400 crucible capacity. (450 to 1200 lbs. in red brass or 150 to 400 lbs. in aluminum).

MELTING EFFICIENCY

—as proved in this modern foundry, depends on plant co-ordination, as well as individual equipment features. Fisher engineers have long appreciated this fact and supported their experience in design and manufacture of equipment, with a study of its most efficient application under load production conditions. Your foundry output and costs will materially benefit by the results of this study, as has the foundry of the Hammond Brass Works and innumerable other leaders in the industry. Consult Fisher engineers for equipment recommendations and information on correct application in your melting shop.

LITERATURE on any of these units sent on request.

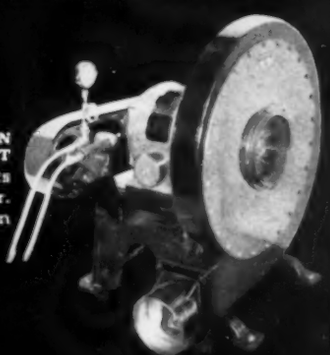
FISHER FURNACE COMPANY
1742 N. KOLMAR AVE., CHICAGO, ILLINOIS



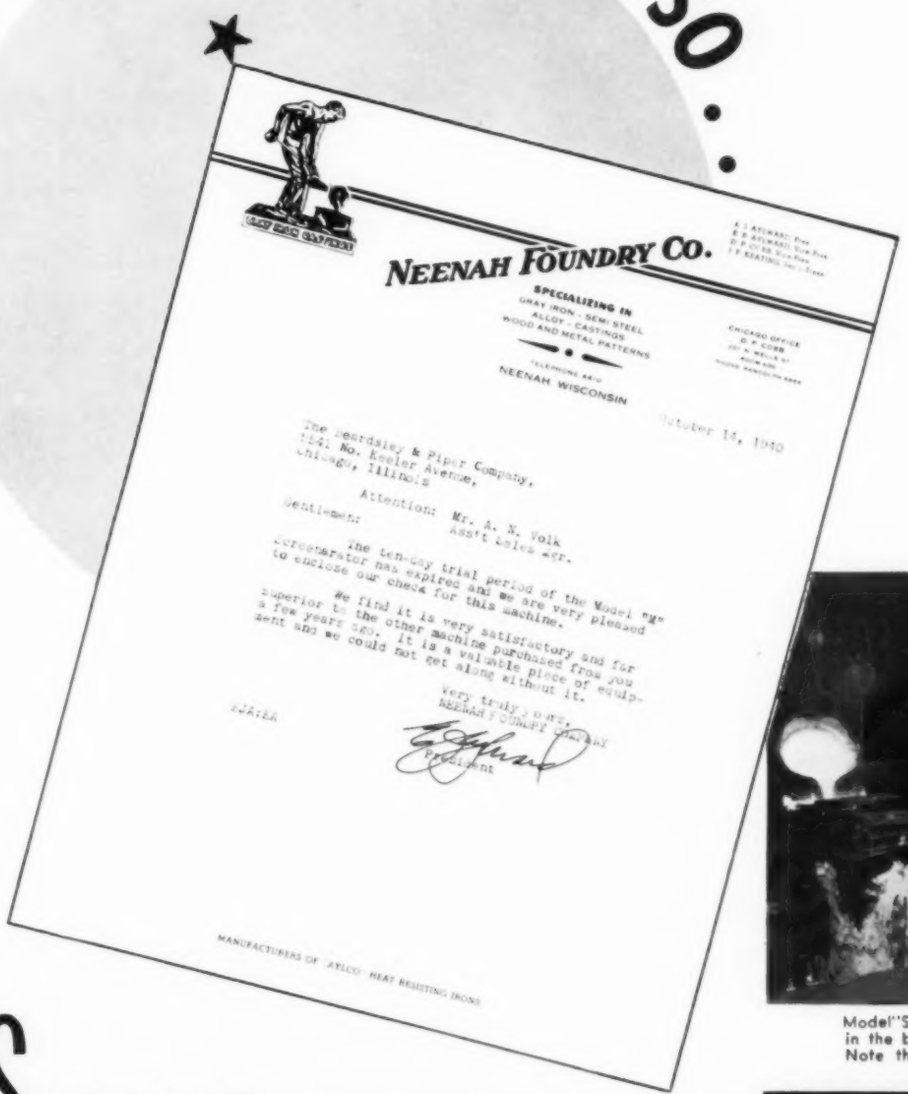
FISHER B.B.I. HAND OPERATED CRUCIBLE
Oil or gas fired. No. 150 to No. 400 crucible capacity. (450 to 1200 lbs. in red brass or 150 to 400 lbs. in aluminum).

FISHER TYPE "S" STATIONARY CRUCIBLE MELTING FURNACE
Oil or gas fired. No. 20 to No. 250 crucible capacity. (60 to 750 lbs. in red brass or 20 to 250 lbs. in aluminum).

FISHER COMBINATION BLOWER AND OIL PUMP UNIT
Oil and air requirements delivered by same motor. Full range in combination sizes.



. THE CUSTOMERS SAY SO . .



NEENAH FOUNDRY CO.

SPECIALIZING IN
GRAY IRON - SEMI-STEEL
ALLOY - CASTINGS
WOOD AND METAL PATTERNS

NEENAH, WISCONSIN

October 14, 1940

The Beardsley & Piper Company,
2541 No. Keeler Avenue,
Chicago, Illinois

Attention: Mr. A. N. Volk
Asst Sales Mgr.

Gentlemen:

The ten-day trial period of the Model "M" Screenarator has expired and we are very pleased to enclose our check for this machine.

We find it is very satisfactory and far superior to the other machine purchased from you a few years ago. It is a valuable piece of equipment and we could not get along without it.

Very truly yours,
NEENAH FOUNDRY Company
By
President

MANUFACTURERS OF "AYLCO" HEAT RESISTING IRONS

Model "S" (1,000 pounds per minute) SCREENARATOR in the brass foundry of a large Eastern manufacturer. Note the easy, natural shoveling height — 14 inches above the floor.

Model "M" (1,500 pounds per minute) SCREENARATOR in a prominent gray iron foundry. Four men shovel. SCREENARATOR elevates sand into storage bins.

SCREENARATORS must be good as evidenced by this unsolicited letter from one of the many hundreds of users who recognize sand conditioning value when they see it.

Other users say: ***"The Screenarator leads the field in quality and price." . . . "Such exceptional capacity and rugged construction are truly amazing in a low-cost portable sand conditioner."***

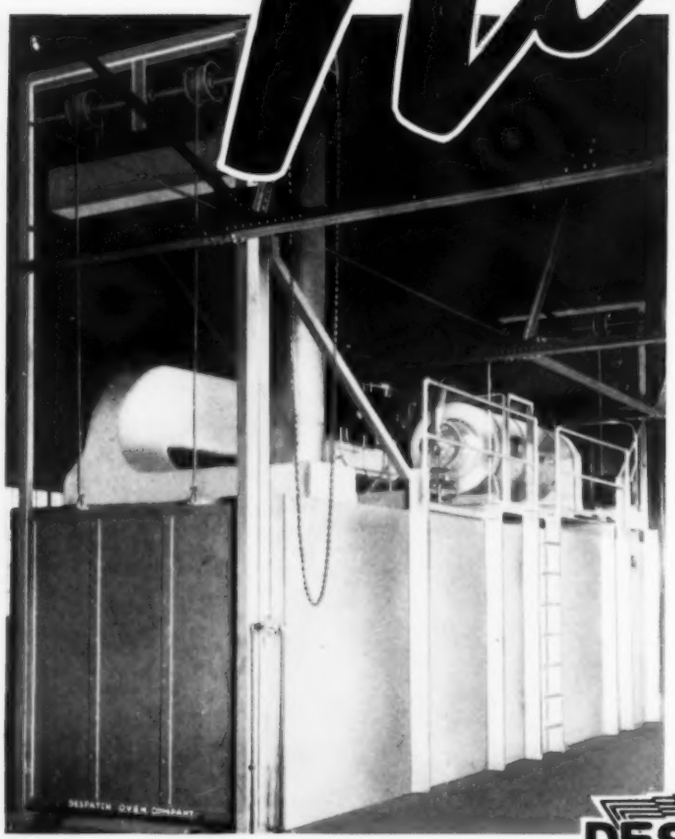
If you would like to try a *Screenarator* in your shop, we'll gladly ship one for a 10-day trial.

★ This letter was unsolicited and represents a true expression of customer satisfaction with the Model "M" SCREENARATOR.

THE BEARDSLEY & PIPER COMPANY

2541 NORTH KEELER AVENUE
CHICAGO, ILLINOIS

FOUNDRY News!



CORE BAKING COSTS 17¢ PER TON REPORTED

THIS figure may seem incredible to many, but not to users of the New Despatch Core Oven. When equipped with patented Despatch "Controlled Combustion" air heaters and improved heat distributing and recirculating systems, the New Despatch core and mold ovens can be relied upon to reduce operating costs tremendously.

The new Despatch oven will increase your core and mold production. Also it will insure uniform temperatures to guarantee even baking for every load—no rejects.

WRITE TODAY!

for the New
Despatch Bulletin NO. 31
It contains illustrations and designs of many Despatch advance features.

DESPATCH BUILT

DESPATCH CORE AND MOLD OVENS

Despatch core and mold ovens for every type of production. Batch type, conveyor type, car and rack type ovens may be equipped with new Despatch "Controlled Combustion" gas or oil fired air heaters and the improved heat distributing and recirculating systems.

NEW DESPATCH COMBINATION CORE BAKING AND ANNEALING OVENS

A new Despatch feature that will increase the utility of your core baking department. The new double duty Despatch oven can be used not only for faster core baking but also for annealing aluminum and magnesium castings because they are equipped with the Despatch dual burner Heaters. Despatch engineers have worked closely with America's largest non-ferrous metal producers to perfect this feature. It has their enthusiastic approval.

MODERNIZE YOUR CORE AND MOLD BAKING OVENS

The efficiency of your present core and mold ovens will be greatly increased by the installation of new Despatch air heaters and air distribution system. This installation is quickly accomplished and will positively improve the performance of your core and mold ovens. Saves time, money and increases production.

DESPATCH OVEN CO.

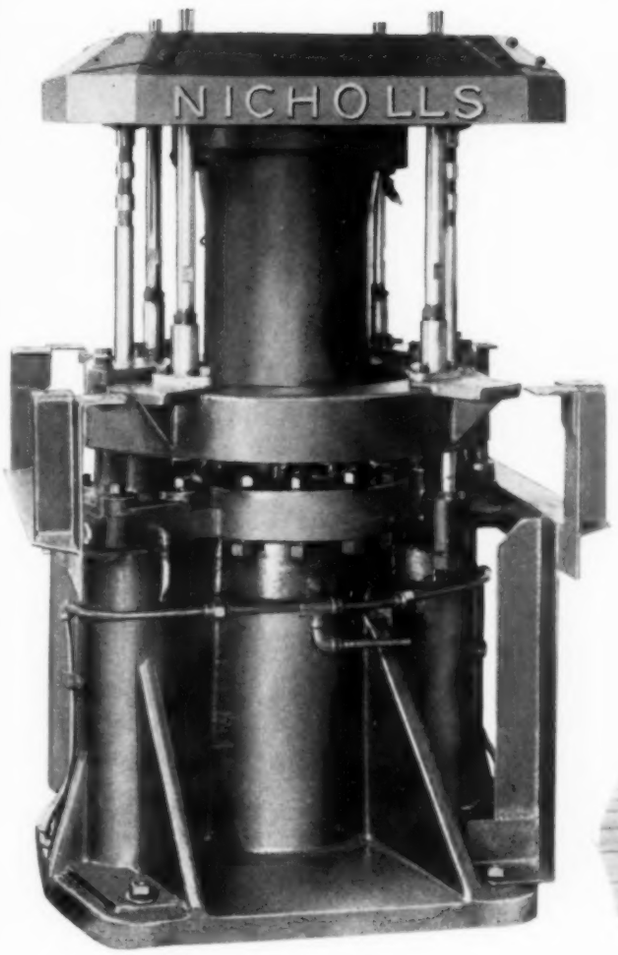
MINNEAPOLIS MINNESOTA

SPEED UP DEFENSE PRODUCTION

With Our Newly Designed

PIN LIFT JOLT STRIPPER MOLDING MACHINE

HARD JOLT—FAST ACCURATE DRAW



No. 8 Type JS Jolt Stripper Molding Machine with guard removed—7" Diameter Jolt Piston, Adjustable draw from 9" to 15" in 2" steps. All pins and bushings hardened and ground.

We are pleased to introduce our No. 8 Type JS Pin Lift Jolt Stripper Molding Machine, adaptable for making shells, sleeves and other deep draw work. We invite you to write for additional information regarding this machine.

Above No. 8 JS Machine as it would appear in foundry. All wearing parts are enclosed and fully protected from sand. Operating valve is mounted on separate stand not shown here.

Wm. H. NICHOLLS Co., Inc.
RICHMOND HILL, LONG ISLAND, NEW YORK

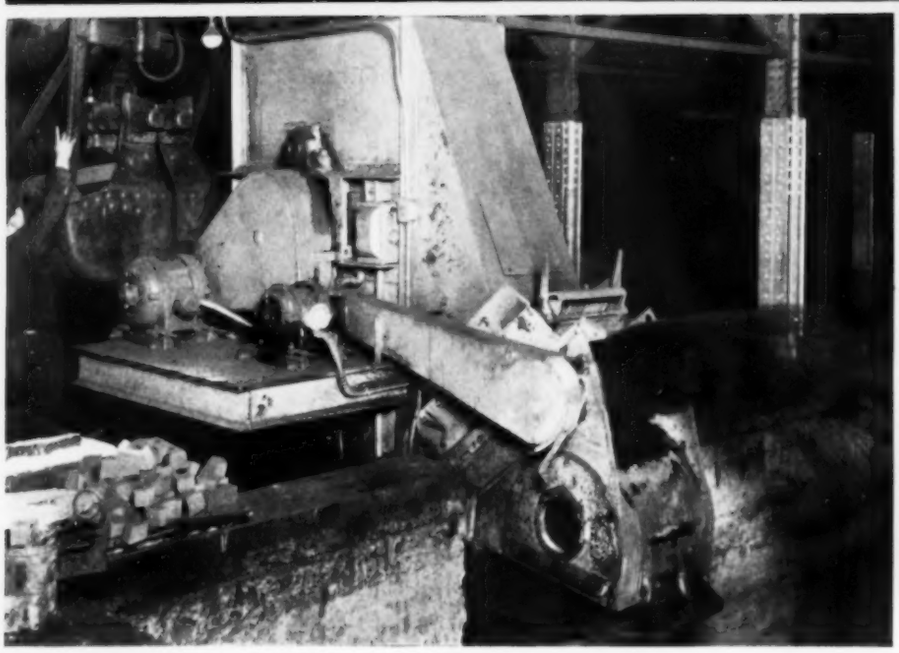
ESTABLISHED 1910

Foreign Manufacturers and Selling Agents—

For Continental Europe and Great Britain—The George Fischer Steel and Iron Works, Schaffhausen, Switzerland.

NICHOLLS

Don't let Hot Sand cut into your Profits!



Partially cooled sand from a muller is discharged into Royer for more thorough cooling, tempering and aerating, reducing hot sand losses for a large Wisconsin grey iron and semi-steel production foundry.

Model NDS
For sand systems in medium to large foundries, requiring 20 to 30 tons of conditioned sand per hour. Easy to install, low headroom.

MODEL NRS
For large production foundries requiring 40 to 50 tons of conditioned sand per hour. For grey iron, malleable and steel foundries.

Model D
Has capacity of 20 to 30 tons per hour like Model NDS but is powered by belt to conveyor or other drive shaft instead of electric motor.

Model R
Like Model D, but has capacity of 40 to 50 tons of cooled, aerated, fluffy sand that molders can work with and be sure of good molds right on down the line.

In these days when sand is worked so hard, proper cooling becomes a problem and discount increases, cutting into your profits.

A Royer is low cost protection against losses from hot sand. Mulled sand when discharged into a Royer undergoes a thorough cooling, tempering and aerating process that completely revitalizes the sand.

The "combing belt" of the Royer rolls the sand over and over, opening it up so the heat can escape. The sand is further cooled and aerated when it is discharged, through the air, into the storage bin or onto a conveyor, depending upon the system in use.

In addition, moisture is more evenly distributed and permeability is greatly increased; 10 to 20 points in fact, by actual check.

There's a big difference between plain mulled sand and sand that has been cooled and aerated by a Royer after mulling—and there's a big difference in the savings, too! It's a matter of record.

Four stationary models that can readily be included into any sand system next to the mixers or mullers —capacities from 20 to 50 tons per hour. Send for bulletin.

THE ROYER

ROYER FOUNDRY & MACHINE CO. KINGSTON, PA.

DIXIE BOND

is the strongest clay bond of any type ever offered American Foundrymen

HERE ARE THE FACTS:

	DIXIE BOND	75% DIXIE 25% BENTONITE	50% DIXIE 50% BENTONITE	25% DIXIE 75% BENTONITE	BENTONITE
Per cent bond used	4%	5%	5%	5%	5%
Tempering water	2.5%	2.5%	2.5%	2.5%	2.5%
Permeability	178	178	178	169	167
Green comp. strength	9.9	16.4	14.2	11.6	9.9
Dry comp. strength	47	44	49	54	83
Hot strength—1000° F.	35	50	60	110	195
2000° F.	25	100	190	230	490
Retained strength after heating to 800° F. and cooling	20	26	40	45	55

Retained strength indicates the amount of lumps at shake out. Note that bentonite is continuing to progress to still higher strengths at 2000° F. while Dixie shows a desirable collapsibility.

USE STRAIGHT DIXIE OR COMBINATIONS AS ABOVE TO GIVE THE DRY STRENGTH YOU NEED AND NOT SOME UNREASONABLE DRY STRENGTH THAT CAUSES ONLY TROUBLE. MAY WE SEND YOU A SAMPLE?

EASTERN CLAY PRODUCTS, INC.

EIFORT, OHIO

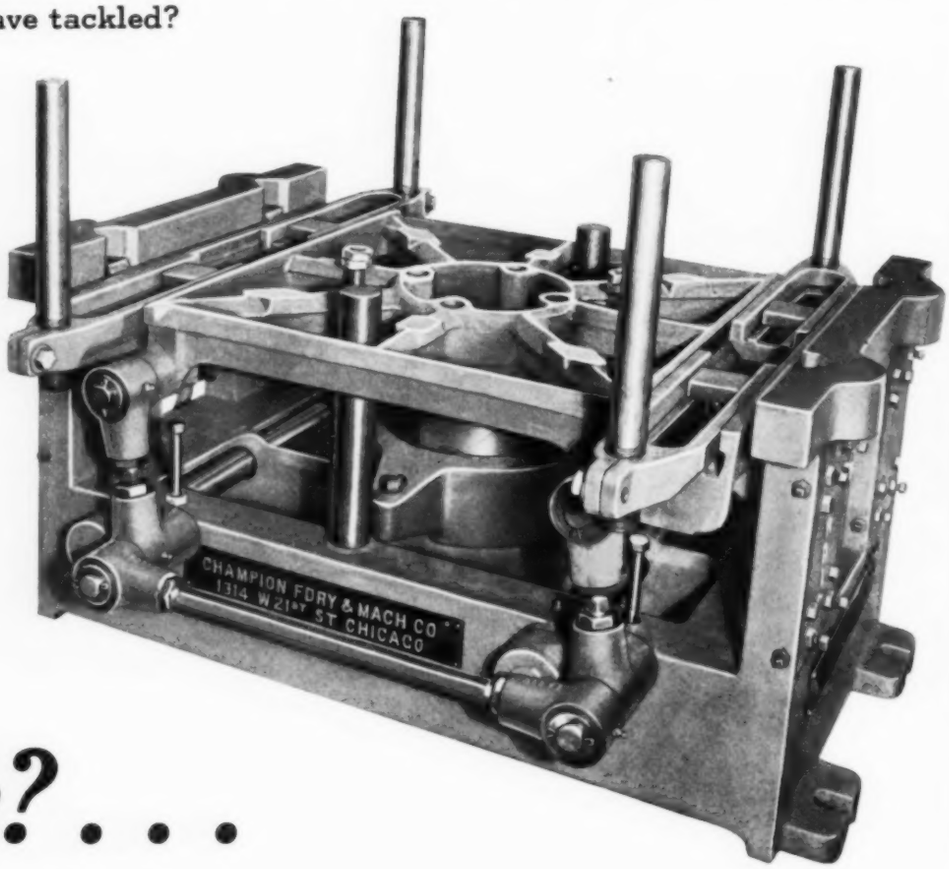
DETROIT: 1414 United Artists Bldg. BUFFALO: 228 Highgate Ave.

CHICAGO—Western Materials Co. MONTREAL—Webster & Sons, Ltd. LOS ANGELES—H. C. Donaldson & Co.
MILWAUKEE—Walter Gerlinger, Inc. CHATTANOOGA—Porter Warner LONDON—District Chemical Co.
MOLINE—Industrial Products Co. MINNEAPOLIS—The E. R. Frost Co., Inc.

Do You Know . . .

That Champion Power Push-off Machines lead the field?

That Champion Power Push-off Machines have never failed on any job they have tackled?



Manufactured with either swivel brackets for adjustment in both length and width, or, with sliding brackets (cut shown) for adjustment in width only.

Why? . . .

BECAUSE the principle of the draw mechanism is designed for 100% efficiency on push-off jobs.

BECAUSE the accuracy of the draw does not depend on the guides or cylinder.

BECAUSE the power is applied direct to the load, not through the crank mechanism.

BECAUSE the four-point crank mechanism acts as a positive equalizer, insuring a perfect lift, even with an unbalanced load.

BECAUSE they are precision built, with HARDENED and GROUND PINS and BUSHINGS used on all crank, connection and connecting rod mechanism.

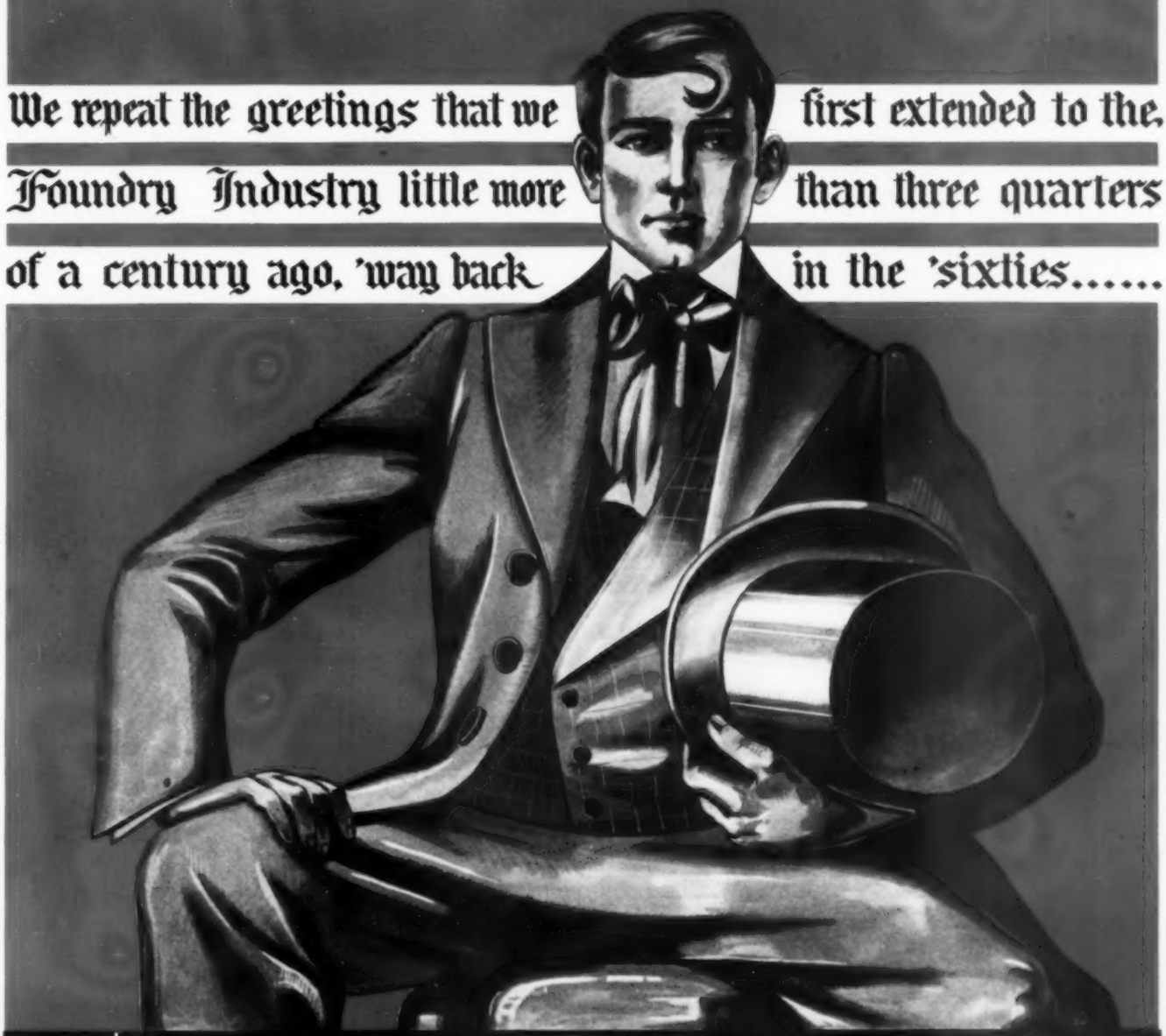
BECAUSE they are built right and work right—they won't let you down.

CHAMPION FOUNDRY & MACHINE CO.

1314 WEST 21st STREET CHICAGO, ILLINOIS

Manufactured in Canada by John T. Hepburn, Ltd., Toronto, Canada

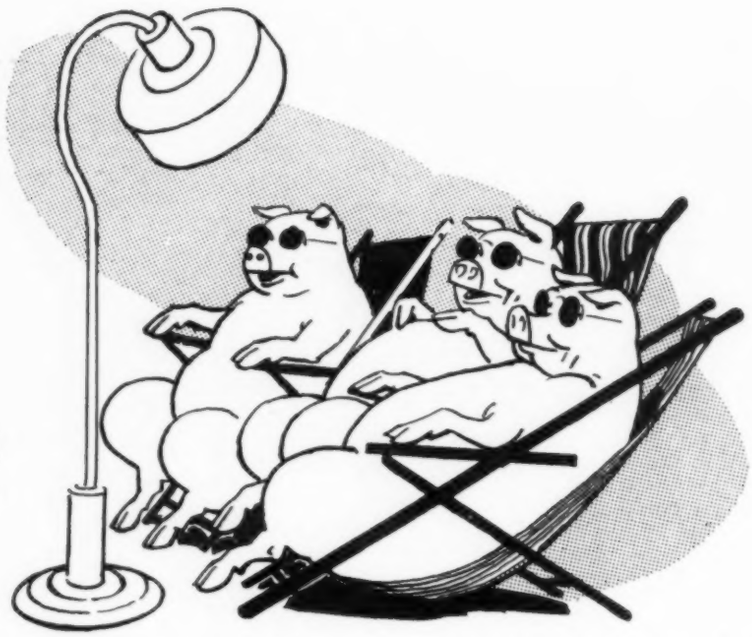
We repeat the greetings that we first extended to the Foundry Industry little more than three quarters of a century ago, 'way back in the 'sixties.....



Speaking in a figurative sense, the Globe Iron Co. was young, vigorous and starry-eyed when it first sent season's greetings to American Foundrymen. Wagons rolled westward, the years rolled on, and the Globe Iron Co. rolled up an enviable record of service since that first message was sent, thanking foundrymen for their patronage and wishing them good health, cheer and prosperity. The gift we gave them then, as today, is the high quality of GLOBE SILVERY IRONS. We cherish the good will that has made pleasant our dealings with the industry, and repeat the message we sent out so long ago: We thank our customers for their valued patronage, and wish them a more prosperous, successful New Year, during which we will welcome the opportunity to be of greater service.

The Globe Iron Co., Jackson, O.

We absorb heat FASTER!



U·S·S CARILLCO Piglets are designed for maximum heat absorption — faster melting. Careful research proved that their trapezoid shape exposes more surface per pound of iron, allowing heat to reach the interior of the pig quickly and evenly from all directions. The result is less fuel used, lower melting costs and more efficient production.

Easily handled CARILLCO Piglets cut labor costs. Weighing only forty pounds, they stack easily and safely. Their small size* makes even distribution of the furnace charge possible in a shorter time.

Fewer rejects occur when U·S·S CARILLCO Piglets are used. Their fine, uniform grain structure assures greater uniformity in the melt and finished castings. CARILLCO Piglets are *clean*—free from dirt, sand, kish and other foreign matter. And they are made from all ore iron.

Available in all ranges of silicon from .75 to 4.50% and manganese from .5 to 2%, their analysis is held within close limits. Whatever your specifications, you can be sure every shipment will reach you consistently uniform.

U·S·S CARILLCO Piglets are equally satisfactory for cupola practice or air furnace operations. For better castings and fewer rejects try them on your next order.

U·S·S CARILLCO PIGLETS

AMERICAN STEEL & WIRE COMPANY · *Cleveland, Chicago and New York*

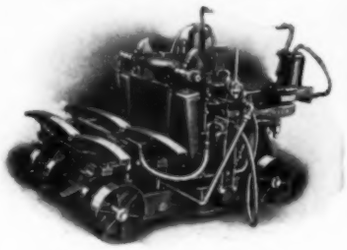
CARNEGIE-ILLINOIS STEEL CORPORATION · *Pittsburgh and Chicago*

**Carilco Piglet dimensions: Top (or bottom as cast) 18" x 1¾". Bottom 21" x 4¾". Thickness 2¾". They are uniform in size. Approximate weight—40 lbs.*

Southern Pig Iron in standard form, produced by Tennessee Coal, Iron & Railroad Company, Birmingham, Ala., is also available for shipment throughout the Northern and Southern States. Utah Piglets are available on the West Coast from the Columbia Steel Company, San Francisco, Cal.

UNITED STATES STEEL

Column Jar Squeezer



Hinged Jar Rollover Pattern Draw Machine

Trunnion Jar Rollover Pattern Draw Machine

Jar Flask-Lift Machine

Jar Squeeze Flask-Lift Machine (Pintle Post)

Plain Jarring Machine

The Right Type Machine for Any Molding Need...

TABOR

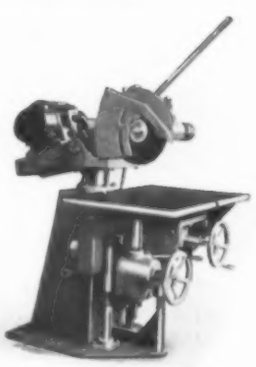
TRADE 1884 MARK

MOLDING MACHINES

You will find the right type of molding machine for almost any foundry need among the extensive line of Tabor equipment. Where we cannot recommend a standard model to meet your requirements properly, we will engineer and build a machine that will. Fifty years of foundry experience is yours for the asking. May we consult with you on your molding problems and needs?

TABOR-BRASIVE CUT-OFF MACHINE

A remarkable machine as hundreds of foundrymen-users will tell you. For example, it removes 2-inch risers from pure nickel castings in 12 seconds flat, and makes equivalent speeds on all other tough metals and alloys. In extensive use in leading non-ferrous foundries.



TABOR MANUFACTURING CO.

6225 Tacony Street **Philadelphia, Pa.**

Send direct to AO

for your N. F. A. Goggles

All N. F. A. and N. A. S. O. Goggles are now sold directly by the manufacturer, American Optical Company . . . and no longer through the National Founders Association. So now you can write directly to the AO branch office nearest you for the same goggles you have always bought: The No. 305-50 NFA "Comfort Goggle" shown above, supplied in the popular 50-mm size . . . with pliable leather mask and wire-screen eyecup-ventilators.

Also available is No. 304 N. A. S. O. Goggle, same as the goggle shown, except for smaller size: 45.8 mm. Both goggles are fitted with Super Armorplate Lenses . . . clear or glare-proof Calobar . . . curved for *extra strength*. For quickest service, send your orders to the nearest of American Optical Company's 259 branch offices.

BUY AMERICAN . . . BY AMERICAN

American Optical Company

Factories at Southbridge, Mass. **In Canada, Consolidated Optical Co., Ltd.** **Branch offices in all principal industrial cities**

7714

MACKLIN
Grinding Wheels

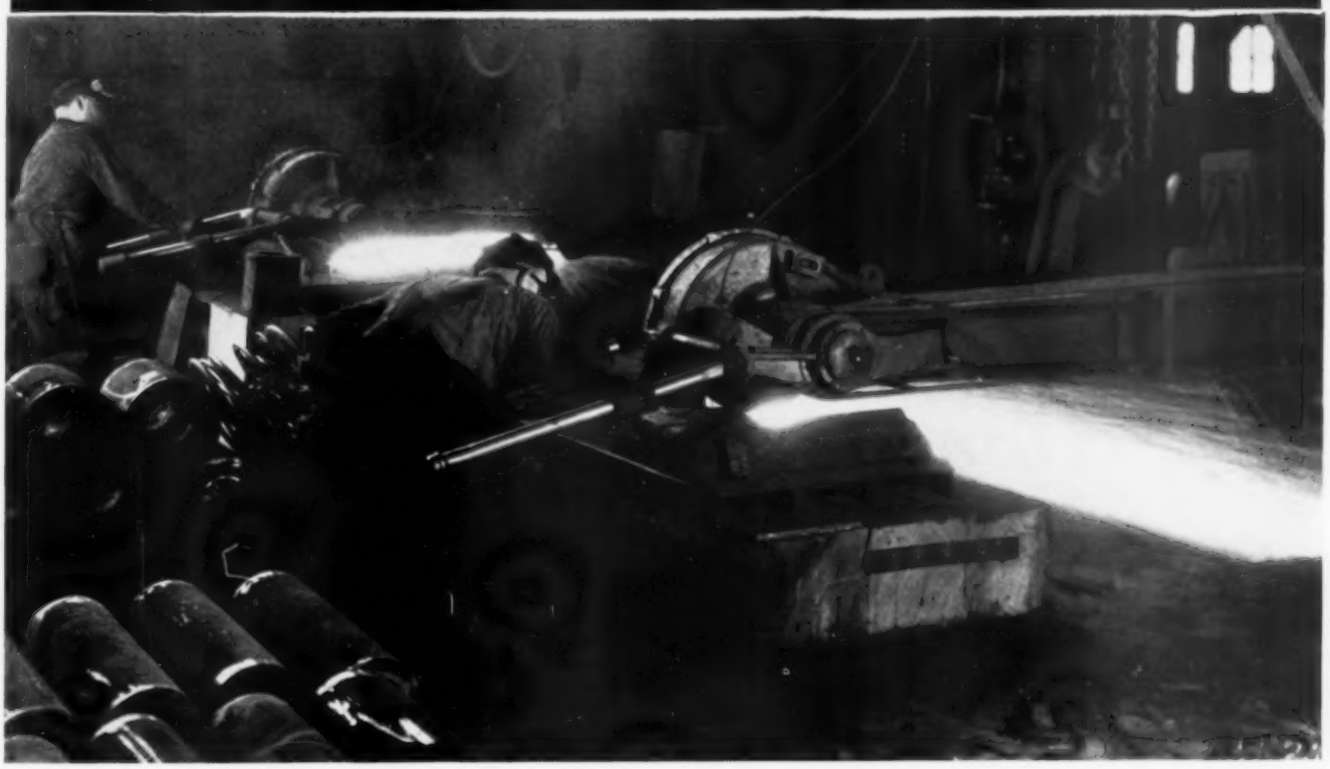


Illustration shows swing frame grinders equipped with Macklin Wheels, grinding steel castings for railroad equipment. This large industrial concern is only one of the many that insist on Macklin Grinding Wheels, not only for swing frame use but for use on floor stands, portables or any other grinding equipment. Macklin Grinding Wheels will "Protect Your Production". They cut cool and fast and give long life.

Ask for the services of a Macklin Sales Engineer who will, without obligation, help you solve your grinding problems.

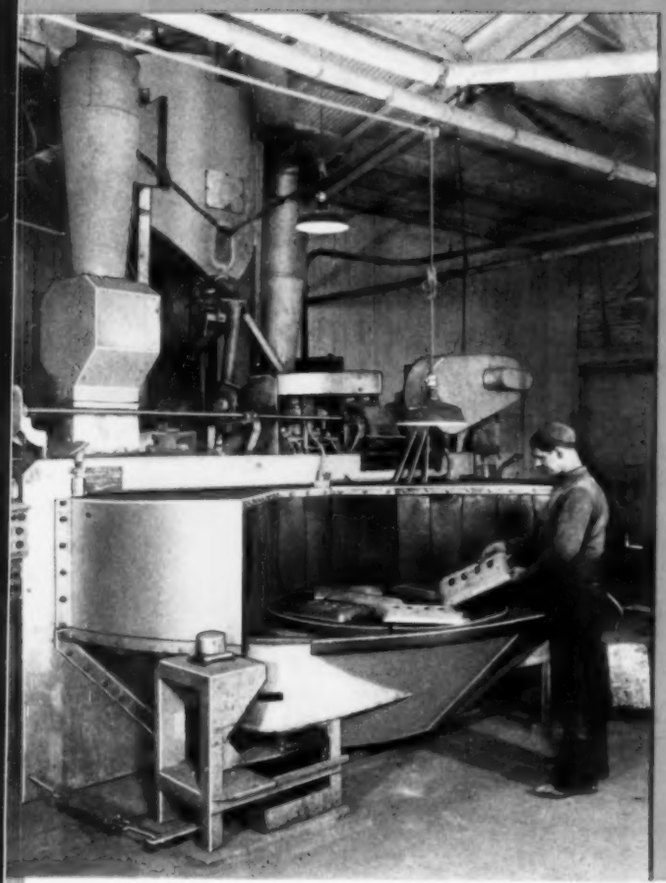
MACKLIN COMPANY

Manufacturers of GRINDING WHEELS—JACKSON, MICHIGAN, U. S. A.

Distributors in all principal cities

Sales Offices:—Chicago - New York - Detroit - Pittsburgh - Cleveland - Cincinnati - Milwaukee - Philadelphia

YOU GET THE SHORTEST ... by SPEED CLEANING and ... Airless ...



FOR speed cleaning the WHEELABRATOR has no equal. At least 90% of the work being cleaned in this equipment is handled in from 3 to 15 minutes (including loading and unloading) — and this includes products that ordinarily require 2 to 5 times as long to clean by other methods.

There are a number of factors which contribute to WHEELABRATOR'S incomparable speed in the cleaning and finishing of metals, but the most important of these is the WHEELABRATOR airless blasting unit itself.

This unit throws more abrasive per minute with less horsepower and throws it harder than any other blasting system ever devised — yet the finish can be perfectly controlled.

The use of steel abrasive (shot and grit) instead of sand as the cleaning agent is another element that increases the speed and effectiveness of the WHEELABRATOR blasting method. Sand, unlike steel abrasive, breaks down rapidly and causes

WHAT USERS *Say*

"Our customers will no longer accept castings that are not put through the WHEELABRATOR Tumblast."

Electrocast Steel Foundry Co.

•

"The WHEELABRATOR has not only enabled us to give a finer appearance to our product, but has shown a considerable saving in grinding and grinding wheel cost."

The Perry-Fay Company

•

"The WHEELABRATOR is now an indispensable piece of equipment in our plant and we recommend it for economical, efficient cleaning of cast iron and cast brass."

Dick Brothers, Inc.

"It would be impossible to clean the recesses in our bearing races by any method other than the WHEELABRATOR."

Roller Bearing Co. of America.

•

"The maintenance costs on the machine have been very low, in fact lower than we anticipated."

Lancaster Malleable Castings Co.

•

"It has required practically no maintenance and the operating cost has been far below our expectations."

Acme Steel Company.

•

"The WHEELABRATOR has proved to be an improvement in our brass casting cleaning department far beyond our expectations."

The Central Brass Mfg. Co.

WORLD'S LARGEST BUILDERS OF AIRLESS ABRASIVE BLASTING EQUIPMENT

American

OFFICES IN PRINCIPAL CITIES

RUNS IN THE LONG RUN * of FINISHING METALS with the WHEELABRATOR

undue wear in the blast chamber. Steel abrasive has an added advantage, too, in that it does double duty by rebounding from piece to piece. In order to keep the abrasive clean and free from sand, each WHEELABRATOR is equipped with a high efficiency sand separator.

The design of WHEELABRATOR equipment also has a great deal to do with its superiority in cleaning; for example, the Tumblast machine uses an exclusive endless conveyor which rapidly and completely exposes the work to the blast stream with a minimum of breakage. Fast loading and unloading are made possible by this tumbling method, thereby eliminating lost motion in handling work in and out of the machine.

The WHEELABRATOR Tablast, used for cleaning flat or fragile pieces, gives better coverage, and faster cleaning because: The WHEELABRATOR unit throws abrasive in a long swath rather than in a narrow stream such as that thrown from an oscillating nozzle; then, too, the span reached by the WHEELABRATOR blasting unit is much longer; the bombardment is continual; the products remain in the path of the abrasive stream the entire length of the blast zone; and since the work is carried on revolving tables, the abrasive strikes every exposed surface.

With Specially Designed WHEELABRATOR Cabinets, the same quality of speed cleaning is obtained because rapid and complete exposure of the work to the blast is achieved by subjecting the work to a rolling, tipping, spinning or other motion, while passing through the blast.

* Plus THESE EXTRA ADVANTAGES

1. Perfected Airless Abrasive Blasting.
2. Unusual Savings from speed cleaning.
3. Superb Cleaning Performance.
4. A Wide Range of Finishes that are ideal for final processing such as: galvanizing, plating, enameling, painting, etc.
5. Versatility of the WHEELABRATOR'S application to cleaning problems.
6. Faster Machinability, Longer Tool Life and Accurate Hardness Testing, by reason of the perfection of WHEELABRATOR cleaning.
7. Simplified Inspection of Work — because WHEELABRATOR "washes out" surface defects.
8. "True-to-Pattern" Cleaning — no rounded edges or battered lettering.
9. Valuable Floor Space is Saved, through compactness of equipment design.
10. Lower Maintenance and Operating Costs, proved in side-by-side operation.

Write for Catalog 212 Today

Memo — The NEW American HIGH EFFICIENCY DUST COLLECTOR Cyclone IS A WHIRLWIND for ECONOMY and PERFORMANCE

Write for Circular No. 32

FOUNDRY EQUIPMENT CO.
5 S. BYRKIT ST. MISHAWAKA, IND.
CABLE ADDRESS: AFECO.

LOW-PHOSPHORUS • COPPER-FREE PIG IRON

For years, Chateaugay Pig Iron has helped manufacturers of steel wire and cable, drills, forgings, car wheels, die blocks, gears, rolls and dozens of other items to attain and to maintain an extremely high standard of quality in their finished products.

It is especially suitable for castings of intricate design — where light and heavy sections meet — where increased strength is a necessity — where a hard wearing surface is desired. It helps to close the grain in pressure castings and to prolong the life of acid and heat resisting castings.

Chateaugay Pig Iron, produced by Republic at Buffalo, N. Y., is made from 100% Chateaugay ore — low in phosphorus and copper-free. It is used successfully in acid open hearth, crucible, electric, puddling and air furnaces and in the cupola.

Let a Republic pig iron metallurgist, always at your elbow, tell you what advantages Chateaugay can impart to your product. Write Republic Steel Corporation, General Offices, Cleveland, Ohio.

REG. U. S. PAT. OFF.
REPUBLIC STEEL

BERGER MANUFACTURING DIVISION
•
NILES STEEL PRODUCTS DIVISION
•
STEEL AND TUBES DIVISION
•
TRUSCON STEEL COMPANY
•
UNION DRAWN STEEL DIVISION

MORE THAN A MILLION TONS A YEAR OF HIGH QUALITY

REPUBLIC PIG IRON

"REPUBLIC" (Youngstown, O.)	"PIONEER" (Birmingham, Ala.)	"McKINNEY" (Cleveland, Ohio)	"NIAGARA" (Buffalo, N. Y.)	"CHATEAUGAY" (Buffalo, N. Y.)
Bessemer and Basic	Foundry and Basic	Foundry, Malleable and Basic	Foundry, Malleable and Basic	Low-Phosphorus, Copper-Free

TRUSCON FOUNDRY FLASKS • REPUBLIC CORE WIRE • FOUNDRY NAILS

THE FOUNDRY

EDITORIAL

Industry Offers Broad Service In Defense Program

WITH the majority of foundries now working practically at full capacity and the remainder anticipating that a rush of business will develop for them shortly, some indication of possible future trends may be noted. Undoubtedly, the extreme demands of America's defense work, which now is scheduled to reach a maximum in 1942, may influence the foundry industry to the same marked extent as did the war effort from 1914 to 1918, although the direction may be different. Remarkable progress in practices and products, due partly to extreme demands encountered during the World war and the competitive situation in the period which followed, places the foundry industry of 1940 in position to render a much broader service to the armed forces than was possible a quarter century ago. Castings offer excellent engineering materials for a multitude of new applications.

Thus far the greatest expansion in foundry capacity has resulted from the modernization of existing plants through rearrangement of facilities and the installation of new equipment to replace obsolete machines or to extend mechanical operation. While a number of new plants have been built during the past 15 months, these, for the most part, have been in fields where demand for castings should continue active even after the defense work has subsided, as for example in machine tools, aircraft engines, etc. Nevertheless, emphasis again should be placed on the need for increasing foundry capacity through modernization before investing too heavily in bricks and mortar. Every effort should be made to see that the industry is not hampered by a tremendous excess of plant capacity when this nation again returns to its normal pursuits.

Perhaps the most striking development thus far revealed pertains to the use of cast steel hulls and turrets for tanks. A number of steel foundries now are producing cast armor plate for that purpose and undoubtedly the demand will continue to grow. The following quotation from an article on the American Steel Foundries in the November issue of *Fortune* presents an outside viewpoint upon this important contribution of the steel foundry industry to the defense work:

In the foundry laboratories, which work in constant co-operation with army ordnance engineers, so much progress has been made by the use of microscopic study of cast-steel grain structures, leading to new techniques in the heat treatment of castings, that a steel casting is rapidly becoming practical for use for tank hulls or elsewhere as armor. Already the heat treatment has done for the casting what the mill did for the rolled plate. And experiments are constantly being made to give the casting the face hardening needed for greater resistance to shell penetration.

No critic can be so severe as an army ordnance engineer in judging the work of industry. And well known is the "old army game" of pitting the armor-plate maker against the shell manufacturer. Yet it is the opinion of the ordnance engineers that so great has been the advance of American foundries that their low-alloy castings are today better than those of any other country. However, castings still have not been developed to the point where they are the precision job of the rolling mill. And it is for that reason that the army ordnance engineers have adopted a rule of thumb that in resistance to projectiles a steel casting is only nine-tenths as good as rolled plate of equal thickness.

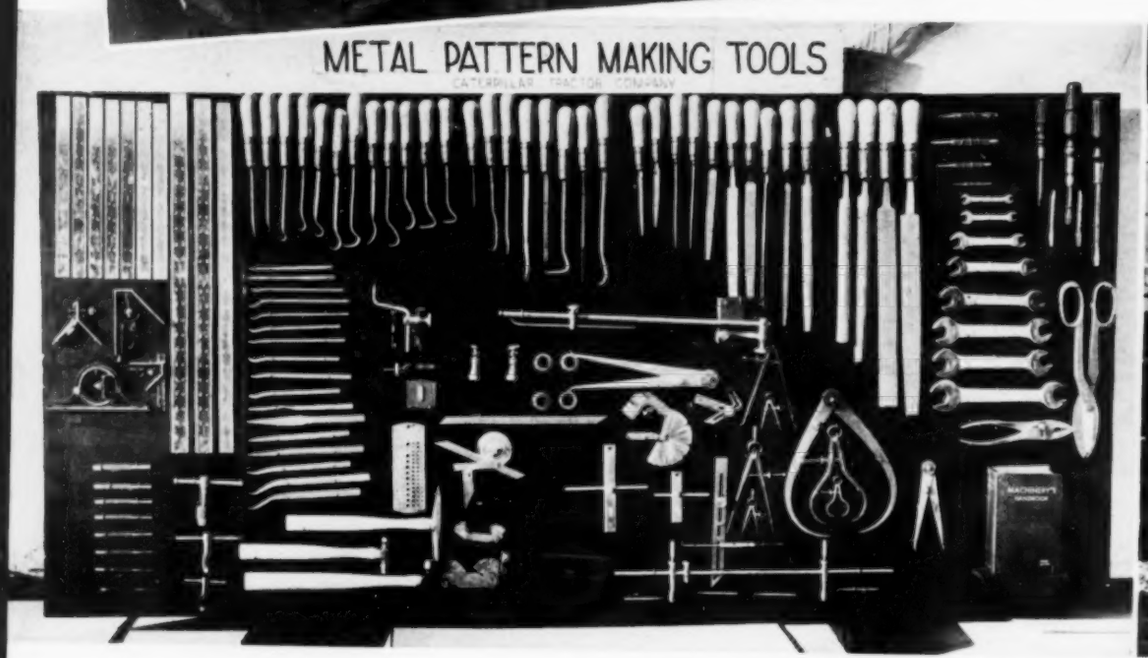
Cast steel, however, has an advantage that offsets this handicap in weight. This is the advantage that is inherent in the principle of casting steel—that of *pouring* steel to the desired shape instead of *building up* the product through use of standard rolling-mill shapes such as plates, angles, and beams.

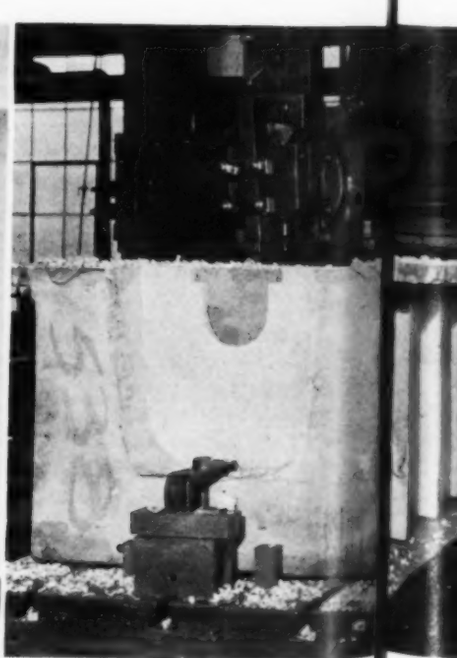
A new trend appears entirely possible in the field of gray cast iron. Increased demands for materials occasioned by the defense program may result in shortages of certain classifications of rolled steel used in the fabrication of various types of structures formerly produced as gray iron castings. If such a situation should develop, undoubtedly many buyers again would look to the foundry industry as their most important source of supply. Little imagination is required to visualize the possibilities presented by the combination of progressive management, modern foundry practices and vastly improved gray cast irons. Properly handled, this business should continue indefinitely with the foundry industry.

Frank G. Steinebach
Editor

PATTERNS DEMAND T

By VAUGHAN REID
President
City Pattern Works
Detroit





THE BEST IN SKILL TOOLS AND MATERIALS

ANY discussion of the pattern making industry, of course, must consider proper training of apprentice patternmakers. Before an apprentice patternmaker is employed in the shop, he should spend at least 2 years in a technical school studying mechanical drawing and learning some of the basic principles of patternmaking. So many wonderful schools are established for that purpose in all of the principal cities that the procedure presents no difficulty. Many ambitious young men with such technical training are looking for a chance to learn a trade.

After starting his apprenticeship, any young man should continue to attend night school to augment his knowledge of mechanical drawing along machine shop and foundry practice lines. A probationary period of approximately 6 months should be required and at the end of that time it should be easy to determine whether or not the young man has the necessary ability to become a capable patternmaker. He should be under the supervision of a competent patternmaker at all times.

Good patternmakers always will be in demand. The organization producing patterns can expect to get the proper returns from these young men only in proportion to the trouble and expense which is put into their training.

The author is very much opposed to the practice of using the apprentice as a delivery boy or as a janitor's assistant. Industry must train its own men in as thorough a manner as possible and every concern using patternmakers must do its part. This insurance on personnel is just as important as the fire insurance on the property.

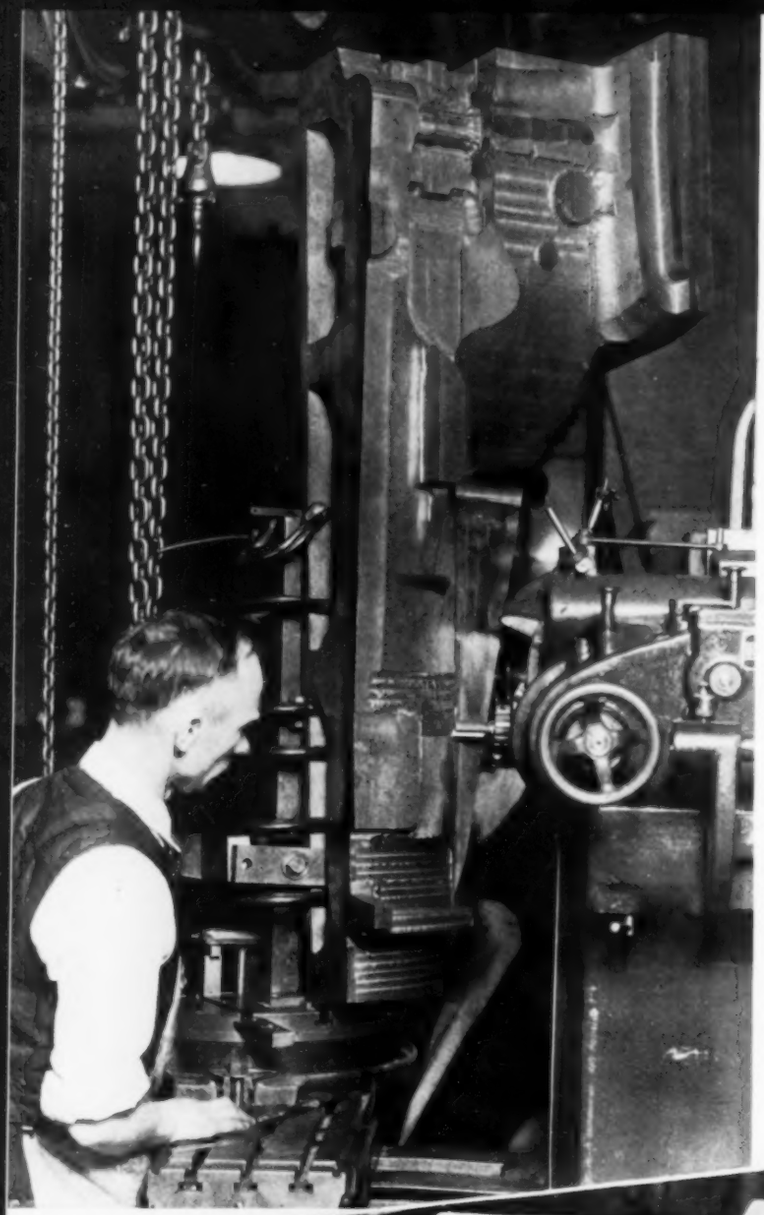
The supply of skilled patternmakers to replace those removed from the productive ranks annually through promotion, new occupations, superannuation, death, and other reasons, is estimated at 5 per cent. Therefore, the only way

Fig. 1 (Left above)—Corner of modern pattern shop where bench men work with overhead trolley system from which flexible grinders are suspended. Fig. 2 (Left below)—Tools for metal patternmaker cost approximately $119. Fig. 3 (Center below)—One half of an aluminum core box for a tractor frame pattern weighs 646 pounds. Fig. 4 (Right below)—Complete set of tools for wood patternmaker costs about $147. Illustrations of tools courtesy Caterpillar Tractor Co., Peoria, Ill.

of maintaining an adequate supply of capable men for replacement is through the planned training of apprentices. Men trained in this way will do their part to develop skill and ability in the patternmaking field.

The patternmaking trade requires the highest mechanical skill. Those engaged in that work must have a knowledge of foundry practice, machine shop technique and drafting. A skilled patternmaker usually is able to make drawings as well as to read them speedily. He must picture in his mind the appearance of the finished article. His knowledge of foundry practice should be such that he can establish parting lines which will lessen the time required for the molder's work and also make production of the castings as simple as possible. He should have a knowledge of the characteristics of steel, malleable iron, gray iron, as well as the many nonferrous alloys. With proper knowledge of that subject he will be better able to design and build production pattern equipment to suit alloy requirements as well as the foundry which makes the castings.

Years ago, we did not consider that the pattern played such an important part as long as it was possible to get a casting somewhere near requirements. The automobile industry has



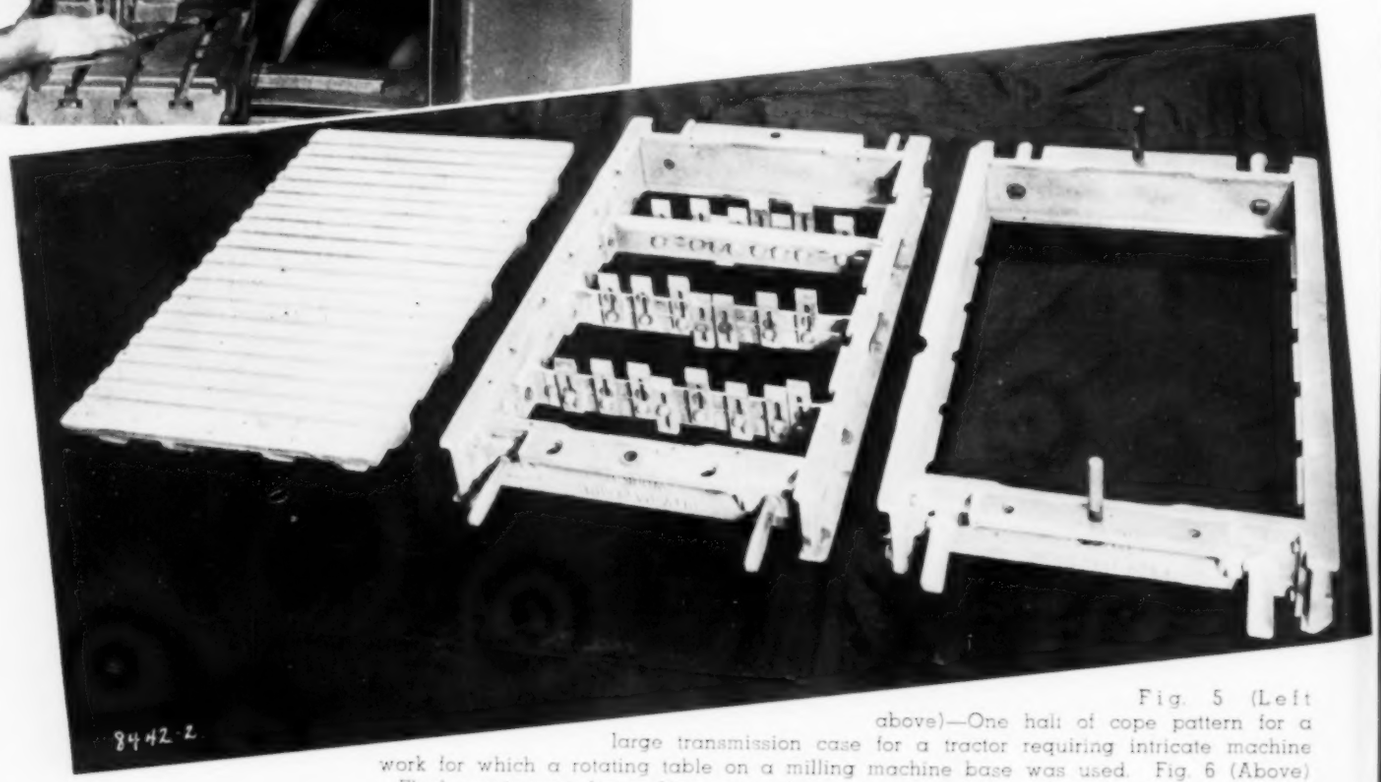


Fig. 5 (Left above)—One half of cope pattern for a large transmission case for a tractor requiring intricate machine work for which a rotating table on a milling machine base was used. Fig. 6 (Above)—Flask equipment for making cast aluminum matchplates. Corrugated bottom board holds sand firmly in place, and bars in flask are adjustable to meet variety of conditions. Fig. 7 (Right)—Cast iron drop plate being machined on milling machine possessing considerable flexibility. Fig. 8 (Extreme right)—Cope pattern for upper half of crankcase assembly

changed that condition. Today, when designing or building any type of pattern, the pattern-maker always must remember that pattern equipment is a very important tool and that a foundry cannot be expected to produce good, uniform, clean castings unless the proper pattern equipment is provided. Too many foundries try to make castings from models instead of insisting that patterns be designed so that they can be used to best advantage by the molder.

Adapt Patterns To Conditions

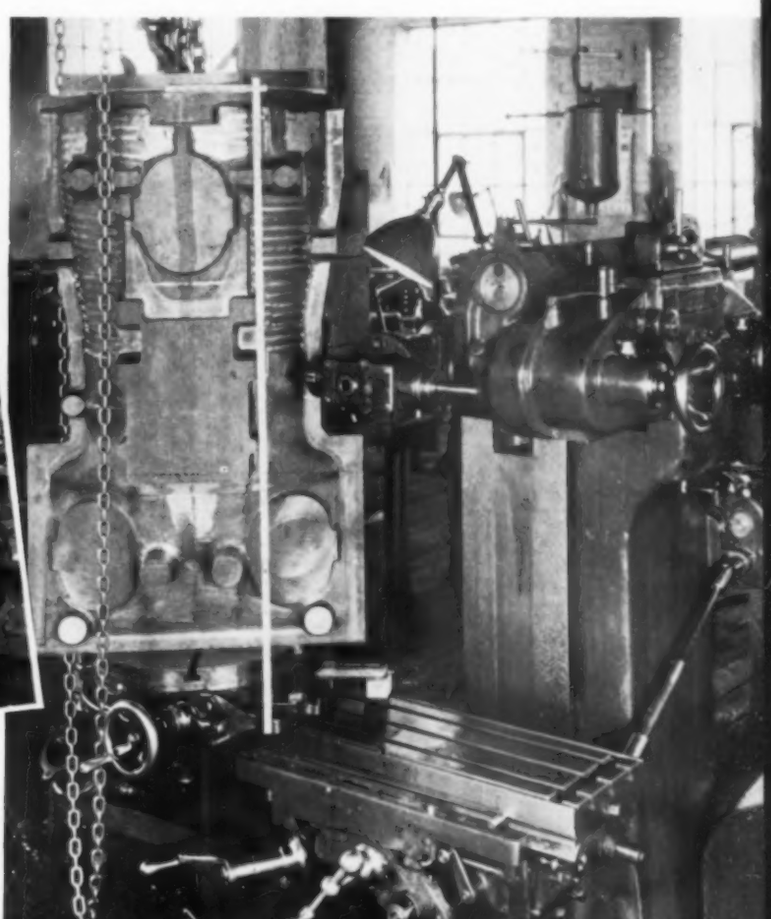
We do not have the supply of real molders today that was available in years gone by. Nevertheless, many jobbing foundries are using solid patterns when such patterns should be split or mounted on follow boards. Patterns are provided with many loose pieces where the job could be handled much better and more economically if cores were used. Patterns are built so that they come apart when they are being rammed in the sand. Cheap lumber is used which goes out of shape and often makes it impossible to draw the pattern from the sand.

Too often the pattern equipment is bought on price alone without any consideration being given as to the ability and engineering qualifications of the pattern source. Plenty of money can be saved by the foundry and the customers if these conditions did not exist. The author has taken a number of job records from files and on examination, after separating the material cost from the labor cost, it was found that on an average the material used in patterns represents approximately 10 per cent of the total cost of the equipment, the remainder of the cost being for labor. As is well known, the price of pattern shop labor is no small item. This is the part of the pattern cost that should have plenty of study and all possible economy should be employed. However, it is rather extravagant to use high priced labor on cheap material.

In the past few years many parts used in the production of automobiles are being changed to cast metals. The splendid work done in the laboratories of the industry by up-to-the-minute metallurgists has been instrumental in extending the case of castings to places where parts previously were made in stampings and forgings and for which castings had not been considered as having sufficient strength.

Developments have been so great in the alloy field that these parts in cast metal show marked superiority over the parts as previously fabricated. Obviously, due to the work these metallurgists are doing and will do, the demand will increase for castings and also for production patterns. When the automotive industry was starting, no one dreamed that metallurgical ability would be such an aid to the pattern industry, both in creating a greater field for patterns and also in working out the best materials that should be put into the patterns themselves.

We have learned much in the past few years by studying methods employed in production plants. Many ideas from these production shops should be used in the laying out of the pattern shop. First of all the equipment should be so arranged that as few steps as possible will be necessary to get to the machines most often used. In some pattern shops (*Please turn to page* 112)



Gating NONFERROUS CASTINGS

GATING of castings must be studied with the thought that a gate has two distinct functions. Primarily the gate is the means of leading metal into the mold thereby permitting the mold to be filled. It also has another function, that of leading molten metal to the necessary risers so that the fluid metal is available to fill the voids caused by shrinkage. Theoretically, gates could be used only to fill the mold and then the risers could be filled through gates or directly. While pouring directly into a riser frequently is done after the riser has been well filled, it never is attempted when the riser is practically empty.

The latter procedure usually results in churning the metal and may force drosses and scum into the castings. Therefore, in gating, provision must be made so that the proper supply of metal is led to the risers and if the risers are to function in the most satisfactory manner, they must be fed with hot metal. Risers fed with cold metal freeze before the adjacent hot metal in the casting begins to freeze and will be useless as feeders.

Of course, many castings come out satisfactorily when all of the hot metal passes through the casting cavity and thence into the riser, leaving the riser still hot enough to feed the casting. In such cases the cross section of the casting is so much smaller than that of the riser that the casting automatically sets sufficiently ahead of the riser to insure fluidity in the latter until such time that the casting needs feeding.

In heavy sectioned castings where heavy risers must be attached, hot metal must be supplied directly to the riser after the casting is filled. If agitation is to be avoided in the riser, the best method is to have the hot metal enter the riser from the gates down in the mold through which the casting was poured. As these risers begin to shrink, there may be need for adding more metal to them to keep up the pressure and to maintain the high temperature necessary for their continued fluidity. In such cases it always is good practice to have an additional supply of hot metal available for pouring into the risers themselves.

Pouring into the risers must be performed skillfully and with a minimum amount of agitation. In some cases it is desirable to provide a surface basin at the side of the riser connecting to the riser with a gate or trough into which the metal is poured and from which it runs into the riser quietly. That reduces the agitation in the riser to a minimum and yet adds the necessary additional hot metal to insure fluidity and maintain the hydrostatic pressure on the feeding connection between the riser and the casting down in the mold.

In very large castings with extremely heavy sections made from high shrinkage alloys such as aluminum bronze, manganese bronze, or some of the silicon bronzes, it frequently is necessary to repeat the filling of the riser several times at predetermined intervals. The author has known of large castings with large risers attached to which metal was added every half hour after the casting was poured, the process continuing for several hours. That insured the molten condition of the riser and an adequate height of riser to produce the necessary hydrostatic pressure to force the feeding to take place.

Provide Adequate Connection

Any consideration of gating also should include a discussion of the gate that attaches the riser to the casting. Frequently it is recommended that this gate be designed so that it indicates clearly by its contour just where it should be cut off. This precaution will provide a casting true to pattern after the riser has been removed. That is not always possible. In fact if the neck or gate between the riser and the casting is restricted, it frequently is found that the restriction freezes and prevents the flow of metal from the riser to the casting, thus defeating the feeding of the casting by the riser.

Hence, the gate between the riser and the casting must be adequate to avoid any chance that the freezing will take place before the feeding of the casting is completed. The gate must be designed to avoid sharp corners that may be washed away by the rush of metal and which may make sand spots in the casting causing rejection of an otherwise perfect product. Furthermore, sharp corners are inadvisable since they tend to cause crystal growth that may intensify the restriction at that point so that the feeding would be retarded.

Therefore, fillets should be provided at the junction of the gate and the casting and the gate and the riser. The riser, of course, must be as

IS IMPORTANT

close to the casting as conditions will permit, since the closer the riser is to the casting, the less distance for the metal to flow from the feeding risers to the casting to be fed. Consequently, the gate between riser and casting should be short, provided with proper fillets, of adequate size to insure against any chance of freezing until all the feeding is completed, and located so that no damage will be done to the shape of the casting as shrinkage takes place and possible distortion of the sand mold occurs.

Shape of the riser also is of importance, and is a part of the gating practice. A square or rectangular riser offers a maximum area for radiation of heat as compared with the volume of metal it holds. Thus, a square or rectangular riser will cool faster than a round riser of the same volume capacity. Therefore, it will be apparent that if the riser must be kept molten for an extended period, it is better practice to use the round riser that has a minimum area from which to radiate heat.

Furthermore, the sharp corners on a rectangular riser tend to cause the crystals to set at these corners, due to rapid heat dispersion, so that finally the only part of the riser that really is effective is a circular center core, the diameter of which is the distance across the smallest dimension of the rectangular shape riser, as shown in Fig. 6. In the round riser, after the first crystals set, they set in uniform rings parallel to the sides of the riser and uniform cooling tends to take place in which (*Please turn to page* 108)

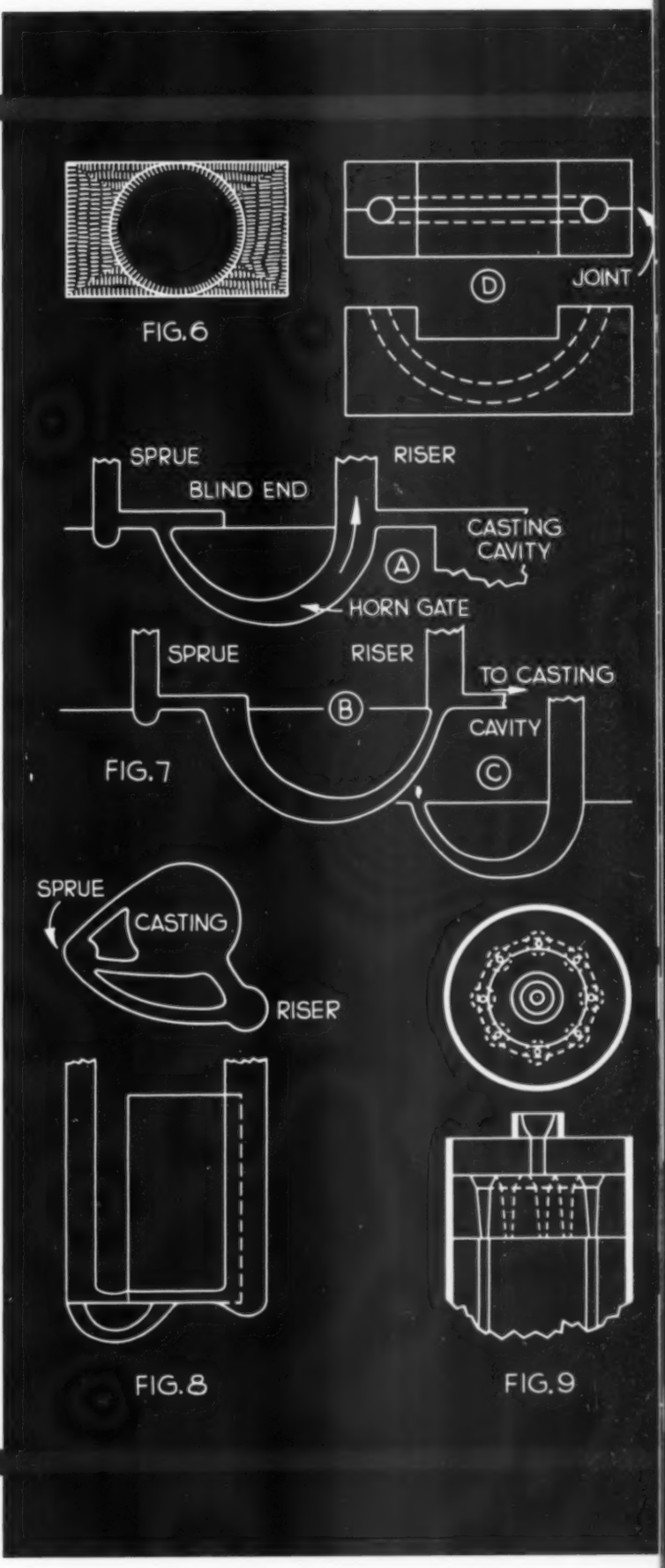


Fig. 6—Schematic representation of freezing crystals in rectangular sprue. Fig. 7—Various types of horn gates with and without skimming risers. At A is shown branch gate with blind end and large end of horn leading to casting cavity. Diagram B depicts usual type of horn gate but with controlling feature of branch gate having area slightly smaller than small end of the horn. In C is shown a bad arrangement of horn gate attached directly to sprue. Sketch D is horn gate made in dry sand core. Fig. 8—Sprue feeds into riser as well as into gates. Fig. 9—One type of strainer gate

By N. K. B. Patch

Steel Castings

RESIST HEAT And CORROSION

By PAT DWYER

IN A former article published in the November issue of THE FOUNDRY, under the title "Steel Foundry Shows Steady Growth," reference was made to some of the features connected with the establishment of a steel foundry in Springfield, O. Since 1917 this foundry has been operated by the Ohio Steel Foundry Co., with main office and plant at Lima, O. A second foundry was built on the same property in 1929 and devoted exclusively to the production of alloy steel castings designed to resist heat and corrosion. Known as the Fahrite division, it is claimed to be about the largest and best equipped high chromium nickel alloy foundry in the country.

Growth of this branch of the foundry industry in the United States is shown in a recent survey covering 94 per cent of the consumers of alloy steel castings. A breakdown shows that in 1939 out of a total of 9646 tons produced, 1204 tons were the familiar 18-8 type; 1293 tons contained 25 per cent chromium and 12 per cent nickel; 551 tons contained 12 to 14 per cent chromium; 357 tons contained from 16 to 18 per cent chromium and 298 tons contained 18 to 30 per cent chromium. The remainder, 5925 tons, included other combinations. Monthly capacity of the Fahrite department of the Ohio Steel Foundry is approximately 200 tons.

Many of the alloy combinations are shown in Table II. Most of the grades carry a high chromium content with or without nickel for heat

Figs. 1 to 5—Various types of alloy steel castings made by the firm for heat and corrosion resisting applications

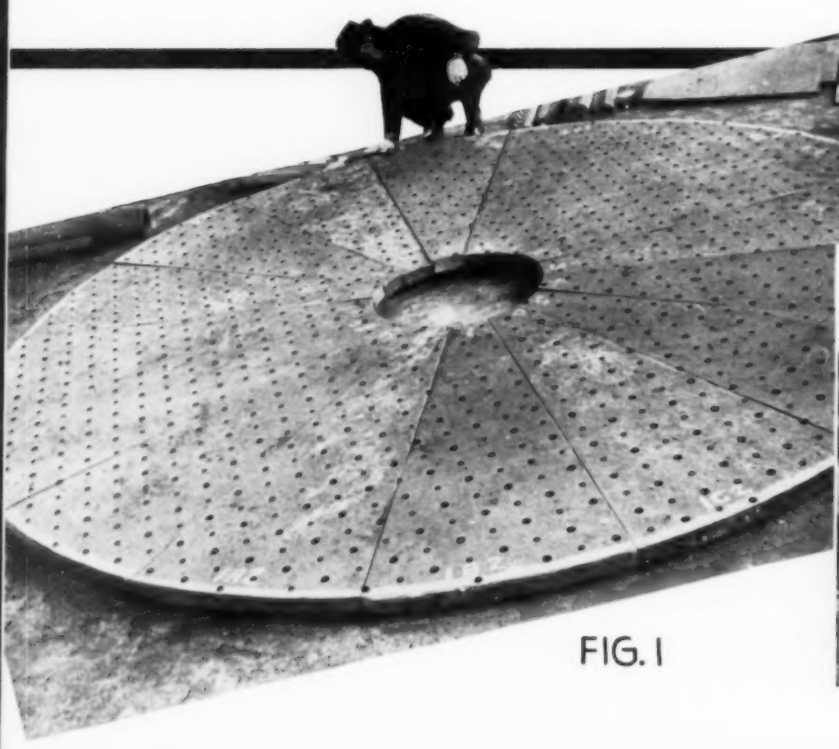


FIG. 1

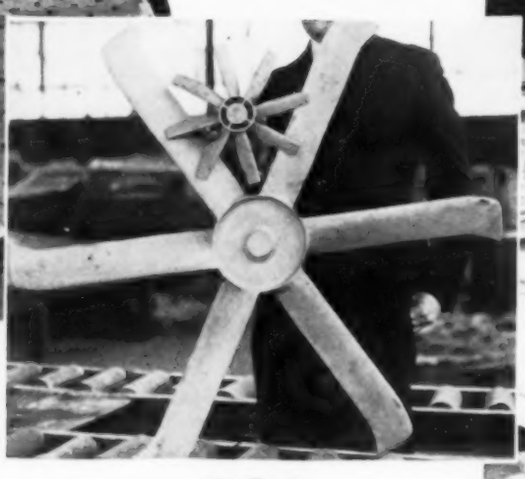


FIG. 2

resistant castings on roasting furnaces where sulphur is high, power plants, oil refineries, steel mills, industrial furnaces, heat treating plants, glass plants, gas and oil burner parts, domestic stokers and many others of a somewhat similar or related character.

A narrow yard separates the foundry, 130 x 300 feet, devoted to the production of plain carbon castings, from the alloy steel foundry, 100 x 300 feet, lying adjacent and parallel on approximately east and west lines. Two rows of columns supporting the roof and crane runways divide the first building into three parallel individual bays. With minor variations this type of floor layout may be regarded as standard in the foundry industry. Style and location of pieces of mechanical equipment vary to some extent depending on local conditions, but all activities are carried on in three bays, one main central bay and two side bays. In the soft steel foundry almost half the first outside bay is devoted to sand storage and sand preparation. The prepared sand is delivered into a series of floor bins and from there is trucked or carried by the crane to the various molding stations. The center section of the bay is occupied by the electric transformer room and for electric furnace auxiliary supplies and equipment. Remainder of the space is occupied by the core making department equipped with gas fired ovens. The chemical laboratory where close control is held over the heats of metal is located in an annex to the main building in this vicinity.

A locomotive type sand slinger made by the Beardsley & Piper Co., Chicago, operates on a track extending from side to side of the building, through all three bays, near the east end. Flasks for which this type of molding

Table I

Physical Properties of Heat-Resisting Alloys

(Determined by Room-Temperature Test in As-Cast Condition)

	Type 24-12	Type 15-35	Type 12-60
Chromium range	23-28	13-17	10-14
Nickel range	10-13	34-37	59-62
Yield strength, lbs./sq. in.	40-55,000	35-45,000	30-40,000
Tensile strength, lbs./sq. in.	80-100,000	60-75,000	60-75,000
Elongation in 2 ins., per cent	15-25	6-12	4-7
Reduction in area, per cent	15-25	6-12	4-7
Brinell hardness	165-175	165-185	175-185
Charpy impact, ft. lbs.	12-18	4-8	5-7
Tests made at 1800 degrees Fahr.			
Yield strength, lbs./sq. in.	75-9,500	7-8,500	5-7,000
Tensile strength, lbs./sq. in.	11-15,000	8-11,000	9-11,000
Elongation in 2-ins., per cent	35-45	35-45	40-50
Reduction of area, per cent	35-45	35-45	40-50
Brinell hardness	40-60	35-45	30-35
Charpy impact, ft.-lbs.	10-15	8-11	5-10
General properties			
Specific gravity	7.7	7.9	8.1
Modulus of elasticity	24,200,000	21,000,000	24,400,000
Coef. of expansion 75 to 1800° F.	0.0000105	0.0000098	0.0000089
Max. operating temperature, degrees Fahr.	2,000	2,000	2,000

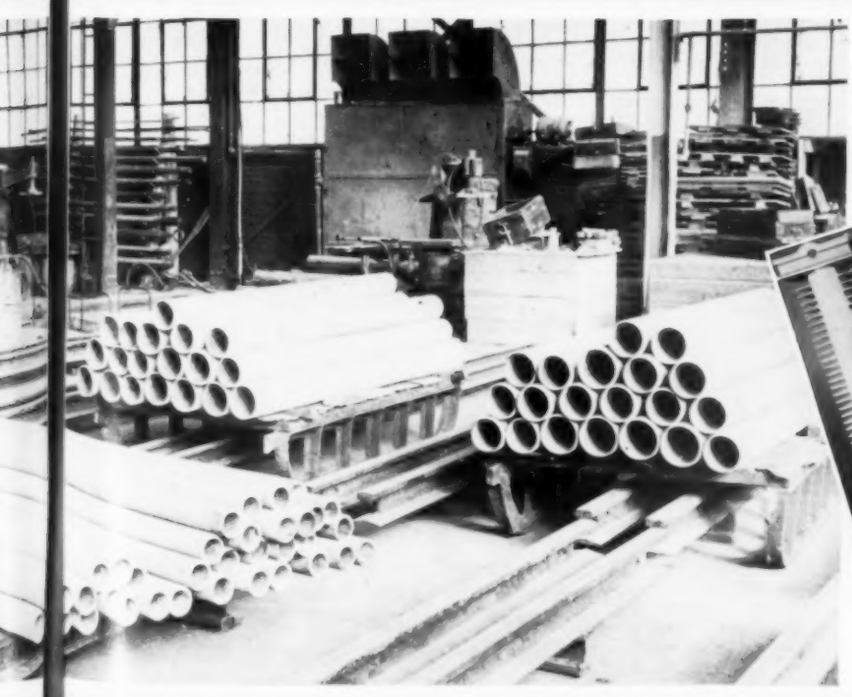


FIG. 3

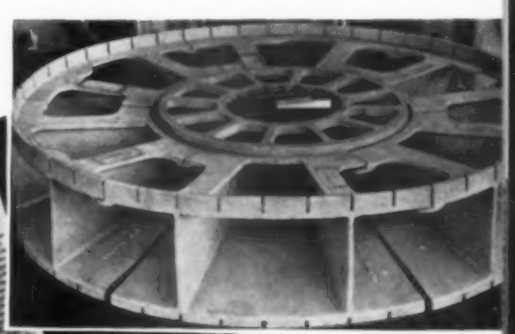


FIG. 5

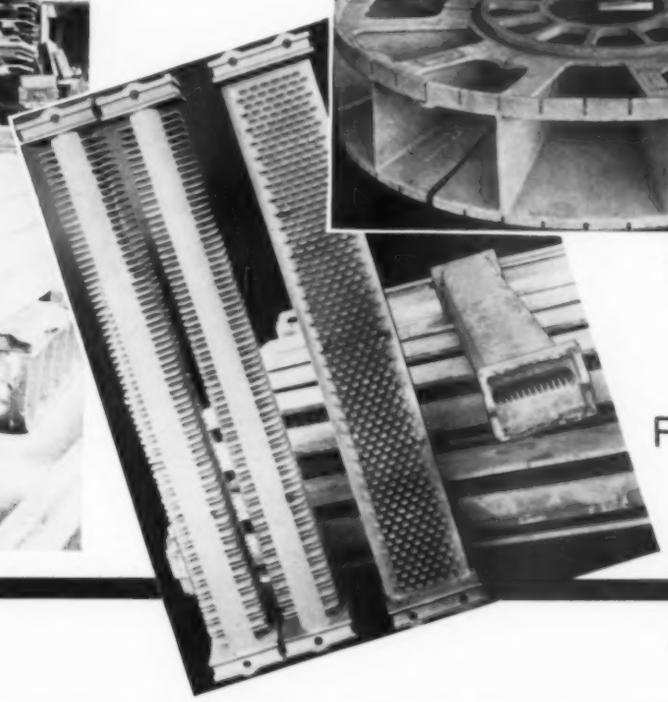


FIG. 4

is satisfactory are placed on either side of the track. After they are rammed full of sand they are removed to the molding floor where they are finished and closed as green sand molds, or transported to the drying ovens if dried molds are required. A large space in the center bay approximately 52 x 140 feet is devoted to floor molding of medium and heavy weight castings on short orders and in wide variety. This section is served by a second sand slinger.

Center section of this bay is occupied by the electric melting furnace, shakeout devices for the sand and the centrifugal machines for the production of tubular castings. The furnace, usually over loaded has a rated capacity of 5000 pounds per heat and was supplied by the Pittsburgh Lectromelt Furnace Corp., Pittsburgh. All the molds are shaken out at a central station from which the sand is taken by conveyor to a storage space and then delivered to the mixer as required.

Although used extensively in the manufacture of cast iron pipe, the centrifugal casting process has been adopted by only a small number of steel foundries in recent years. Many companies and private individuals have experimented with the process over a period of approximately 20 years, but for one reason or another the majority never attained commercial success. The small number of successful experimenters including the Ohio Steel Foundry Co., have perfected a technique that insures the production of high grade steel castings of tubular form of a thickness and uniformity of section to meet the closest specifications. Basic factors in the process as applied to the production of cast iron pipe have been described in THE FOUNDRY on many occasions. A metal cylinder lined or unlined, depending on whether the method conforms to the De Lavaud or the sand spun method, is revolved rapidly while receiving a stream of molten metal. Amount of metal is weighed to correspond with the weight of the desired pipe. The centrifugal action throws the metal against the mold wall to form a casting of uniform thickness.

Steel castings are made in the same manner, but steel is much more difficult metal than iron to manipulate. A high degree of knowledge and skill acquired through experience, a species of sixth sense difficult to explain and impossible to impart, is as important a component of the process as the equipment and materials.

The west section of the middle bay is equipped with two rollover and four jolt machines made by the Herman Pneumatic Molding Machine Co., Pittsburgh, also a battery of drying ovens for the production of dry sand molds. One rollover machine with a 17-foot roller conveyor is located near the center of the floor, while the others and their auxiliary sand bins are located close to the dividing row of columns.

Approximately one half of the third bay is taken up by two rollover machines, one for copes and one for drags, and four long roller conveyors on which the molds are placed for pouring. A transfer car carries the molds from (*Please turn to page* 104)

Table II

Typical Heat and Corrosion Resistant Alloy Steels

Types	Per Cent Cr	Ni	C	Additional Elements	Fahrite Grade*
29-9	26-30	7-9	0.25 max.		C-6
25-20	24-27	19-22	0.25 max.		C-63
25-20Mo	24-27	19-22	0.20 max.	2.5-3.5 Mo	C63-M
24-12	22-26	10-12	0.25 max.		C-7
24-12Mo	22-26	10-12	0.20 max.	2.5-3.5 Mo	C-7M
18-8	18-21	8-10	0.12 max.		C-8
KA-2S	18-21	8-10	0.07 max.		C-8A
KA-2SMo	18-21	8-10	0.07 max.	2.5-3.5 Mo	C-8AM
20-25	19-22	24-27	0.25 max.		C-31
10-20	18-21	9-11	0.12 max.		C-10
15-35	13-17	34-37	0.25 max.		C-1
28	26-30	3.0 max.	0.25 max.	with or without 3 Mo	C-28
18	16-20	3.0 max.	0.15 max.		C-18
12	11-13	1.0 max.	0.12 max.		C-12

*Fahrite is trade name for alloys produced by Ohio Steel Foundry Co.

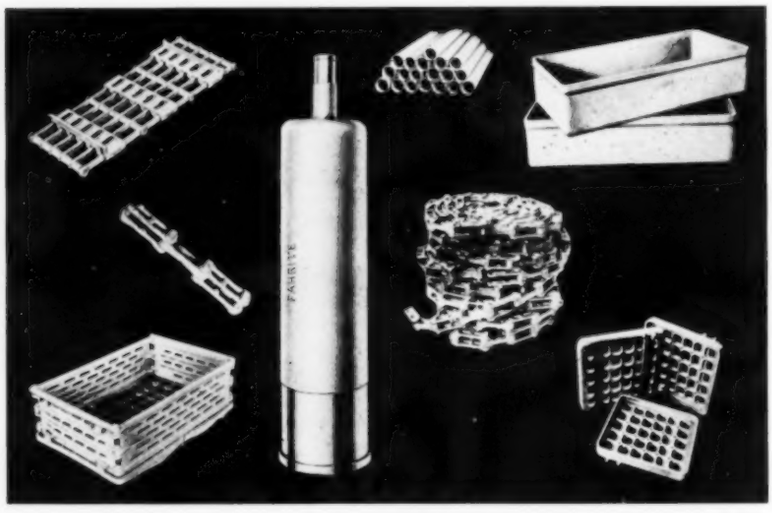
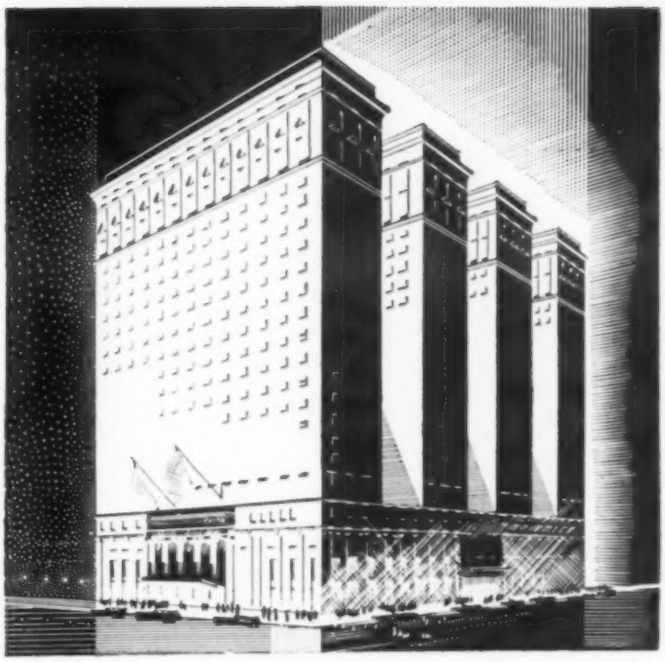


Fig. 6—Alloy steel castings for use in heat treating include chains, boxes, grids, trays and tubes

A.F.A. SELECTS NEW YORK FOR 1941 CONVENTION



Hotel Pennsylvania is located on Seventh avenue across from the Pennsylvania railroad station

THE forty-fifth annual convention of the American Foundrymen's association will be held at the Hotel Pennsylvania, New York, May 12 to 15, 1941, according to a recent announcement by C. E. Hoyt, executive vice president of the association. Decision of the board of directors to stage the meeting in New York followed invitations of the Metropolitan Chapter of the A.F.A. and the New York Convention and Visitors bureau.

The 1941 annual meeting will be devoted entirely to consideration of the technical phases of the association's numerous activities, similar to the most successful 1939 convention which was held in Cincinnati. According to advance plans of Robert E. Kennedy, secretary and norman F. Hindle, assistant secretary, the 4-day convention will feature numerous sessions for the consideration of formal papers pertaining to technical and practical problems in the gray iron, steel, malleable and nonferrous branches of the industry.

Attention will be given to shop operation courses dealing with production problems which relate to sand and to cupola operation, and, as in the past, numerous roundtable discussions will permit an interchange of information intimately connected with practice problems. Other features of the convention will include a meeting devoted to the formal business of the association and the social events which year by year become a more important part of the annual convention.

The entertainment features of convention week activities, including the annual A.F.A. dinner, the plant visitation program and the ladies entertainment program will be under the direction of numerous committees of the Metropolitan chapter which are to be appointed shortly. R. J. Allen, Worthington Pump & Machinery Corp., Harrison, N. J., is chairman of the chapter, J. W. Reid, Robins Conveying Belt Co., Passaic, N. J., is vice chairman, W. A. Phair, *The Journal of Commerce*, New York, is secretary and R. E. Nesbitt, Pratt institute, Brooklyn, N. Y. is treasurer. Sam Tour, Lucius Pitkin Inc., New York, is general chairman of the chapter convention committee. In helping to stage the 1941 annual meeting the Metropolitan chapter of the American Foundrymen's association will have the active support and co-operation of the Philadelphia chapter and of the recently formed Chesapeake chapter which centers around Baltimore.

Ample facilities are provided in the Hotel Pennsylvania, which is located across Seventh avenue from the Pennsylvania station, for the many activities of foundry convention week. Meeting rooms on the ballroom floor, where registration headquarters also will be maintained, should meet the needs of the majority of technical sessions. In addition rooms will be provided in other parts of the hotel for roundtable luncheons and similar features of the program. Ladies registration also will be maintained in the Hotel Pennsylvania.

Castings AT THE METAL SHOW

THAT castings constantly are attracting greater attention at industrial shows was well illustrated at the National Metal Congress and Exposition held at Cleveland, Oct. 21 to 25, in connection with the twenty-second annual meeting of the American Society for Metals. Approximately sixteen foundries exhibited a wide variety of castings to the thousands who attended that metal show, the largest ever held.

The following companies were included among the exhibitors: Aluminum Co. of America, Pittsburgh; American Manganese Steel division, American Brake Shoe & Foundry Co., Chicago Heights, Ill., Ampco Metal Co., Milwaukee; Chicago Malleable Castings Co., Chicago; Dow Chemical Co., Midland, Mich.; Driver-Harris Co., Harrison, N. J.; Duraloy Co., Scottsdale, Pa.; Electro Alloys Co., Elyria, O.; Forest City Foundries Co., Cleveland; Frontier Bronze Corp., Niagara Falls, N. Y.; Fulton Foundry & Machine Co., Cleveland; General Alloys Co., Boston; Hoskins Mfg. Co., Detroit; Lake City Malleable Co., Cleveland; Michiana Products Corp., Michigan City, Ind., and Standard Alloy Co., Cleveland.

Starting Boys

ON THE ROAD TO FOREMANSHIP

PRESENT conditions in the foundry industry indicate the need for foremanship training. National legislation and other factors in the past two years have brought about many changes in the technique of handling men. Urgent need of a training program to improve present supervision and develop new material is evident in practically every commercial establishment.

Although the selection of a prospective foreman is an apparently difficult task, all that really is needed is common sense and a new approach. Essentially a foreman should possess more than a fundamental knowledge of the various foundry processes. A knowledge of melting, furnaces, molding, machines, patterns, cores, sand, cleaning, heat treating, etc., may be required in full or in part depending on the position to be filled. Practically every person is familiar with instances of men with all the qualifications of ex-

Various views taken in the class and shop rooms showing the boys at work upon different phases of foundry operations. At the top is shown bench molding while immediately above depicts work on sand testing. To the right the boys are learning about floor molding

By GEORGE A. DAVIS
Foundry Instructor
Crane Technical High School
Chicago

Above is shown the graduating class of 1938-39 which received 1200 clock hours of foundry training including floor and bench molding, coremaking, cupola practice, sand control, metallurgy, physics, mathematics, and mechanical drafting. All now are employed in Chicago foundries. Left shows the boys taking off a heat from the cupola

cellent mechanics who have failed as foremen.

They have no conception of the human relationship problem, a knowledge of which is of primary importance in the successful handling of men. A foreman also must have at least a fundamental knowledge of elementary economics and applied psychology. The proper time to train a man for prospective foremanship is in his youth. An old dog cannot be taught new tricks, and a man who is set in his ways does not accept new ideas. The training process requires a constant weeding out of the incompetent.

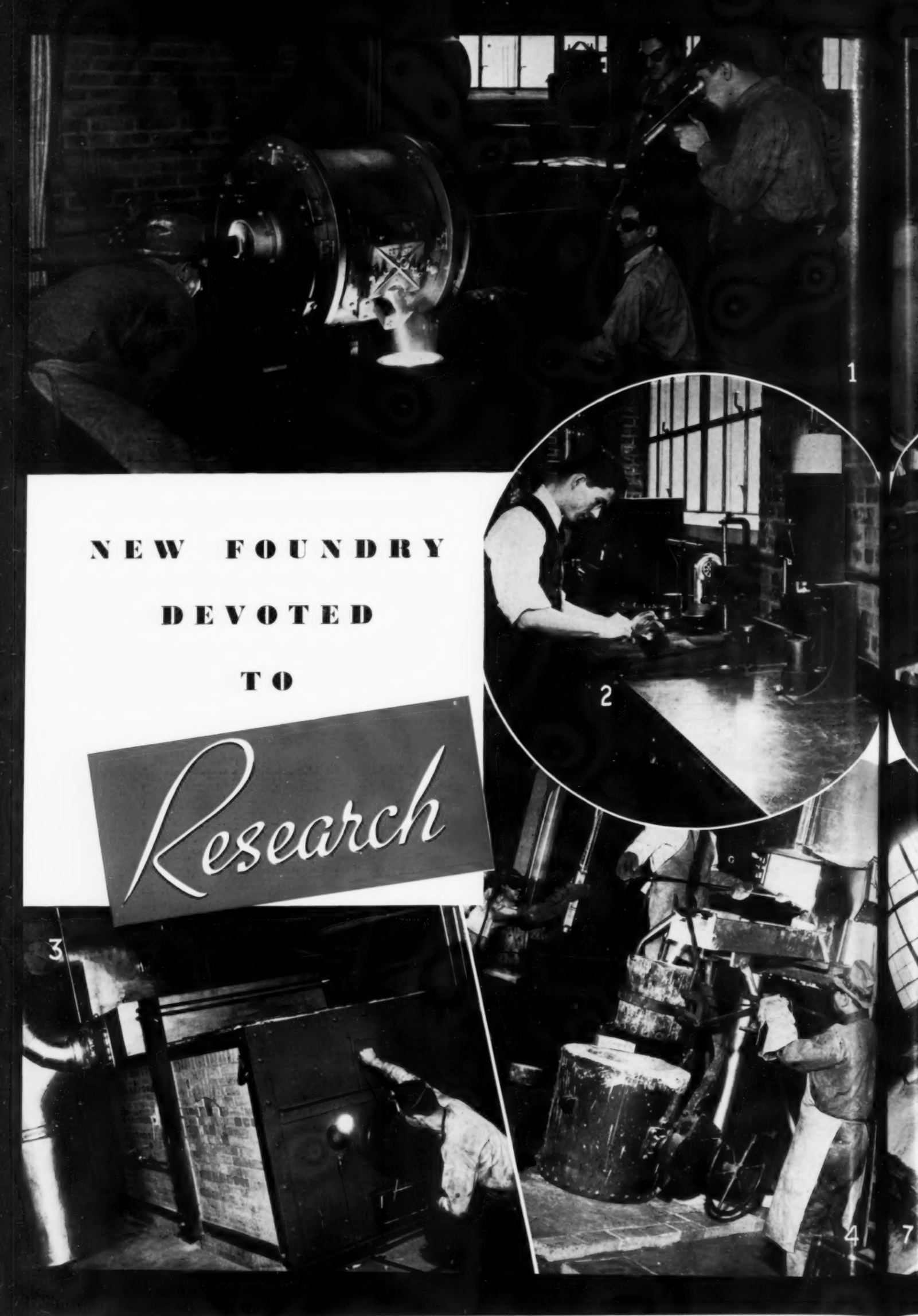
Training Program Develops Leaders

Priceless formative years in a boy's life are from 14 to 18. In that period he may develop into a loafer, an average workman, or a leader. Elements of leadership are not inherent. The only way to decide whether a boy has or has not potentialities of leadership is through a carefully worked out training program. According to general belief boys in that age range are in the know-it-all stage, interested only in girls and good times and are too young to assume responsibility. Experience with carefully selected boys taking the Smith-Hughes foundry course in Crane Technical school, Chicago indicates that they can be started on the path toward foremanship and kept in that path while in school. When these boys enter industry, the employers may have a more advanced stage of training. Their foreman's problem, 5, 8 or 10 years from now will have been solved.

The foreman is in the front rank. He can do more than any other man or group of men to keep industry on an even keel in calm or storm. With this thought in mind, the author 2 years ago began an experimental survey of the young men sent to him to take the trade unit training in foundry work. The findings of the study which extended over a period of 2 years are shown in the following report. The information may be useful to others in showing what a school can do where an honest effort is made to bring out the qualities of leadership in young men.

Should Give Boys Information

These young men elected to take foundry training because of some experience while students in a high school. No further guidance work had been given. The situation was unfortunate, since the author believes that if a group of boys contemplating a trade training course is given help in choice of occupation, information on working and health conditions, wages and promotional possibilities, etc., a bet- (*Please turn to page* 101)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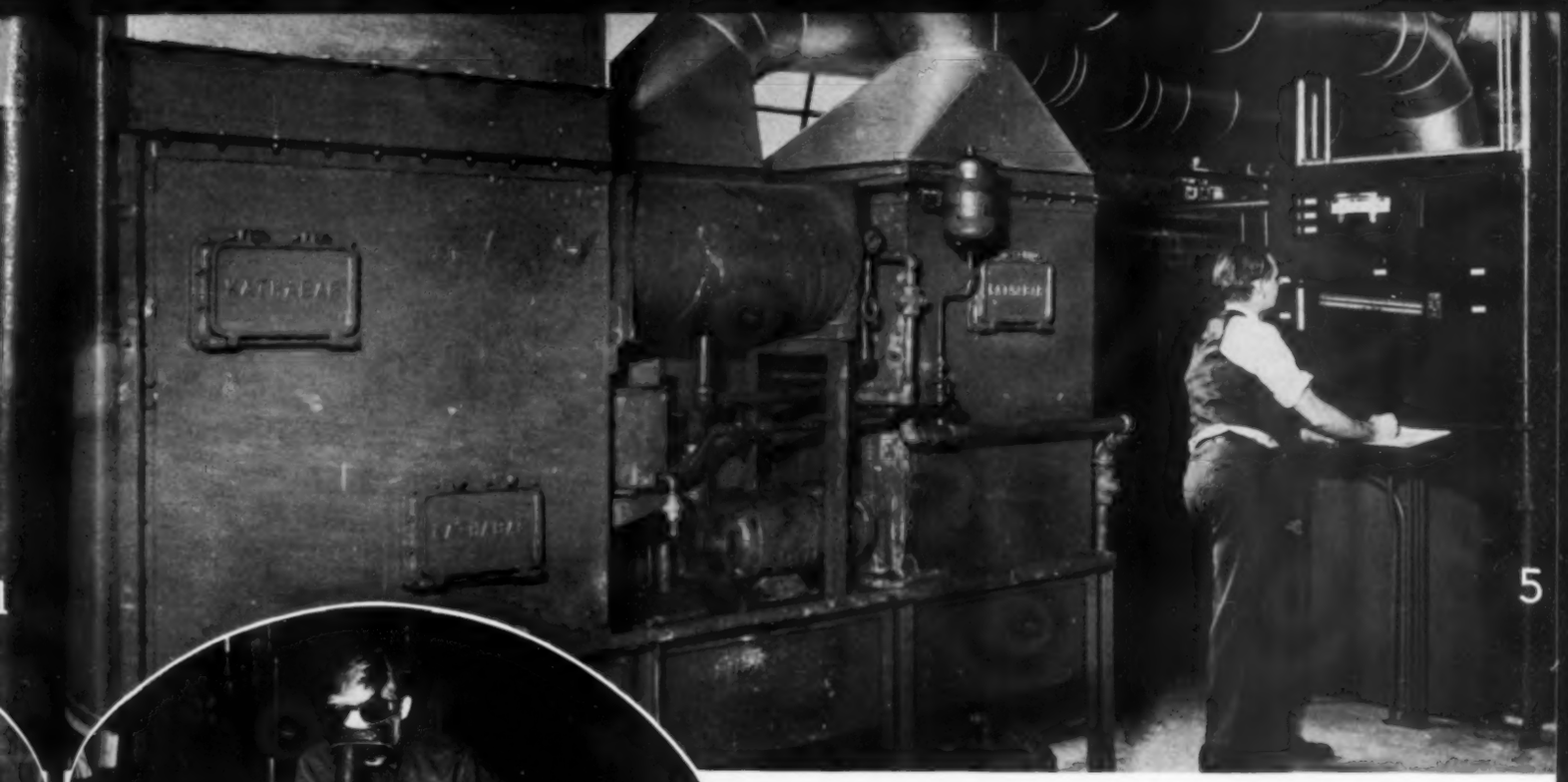
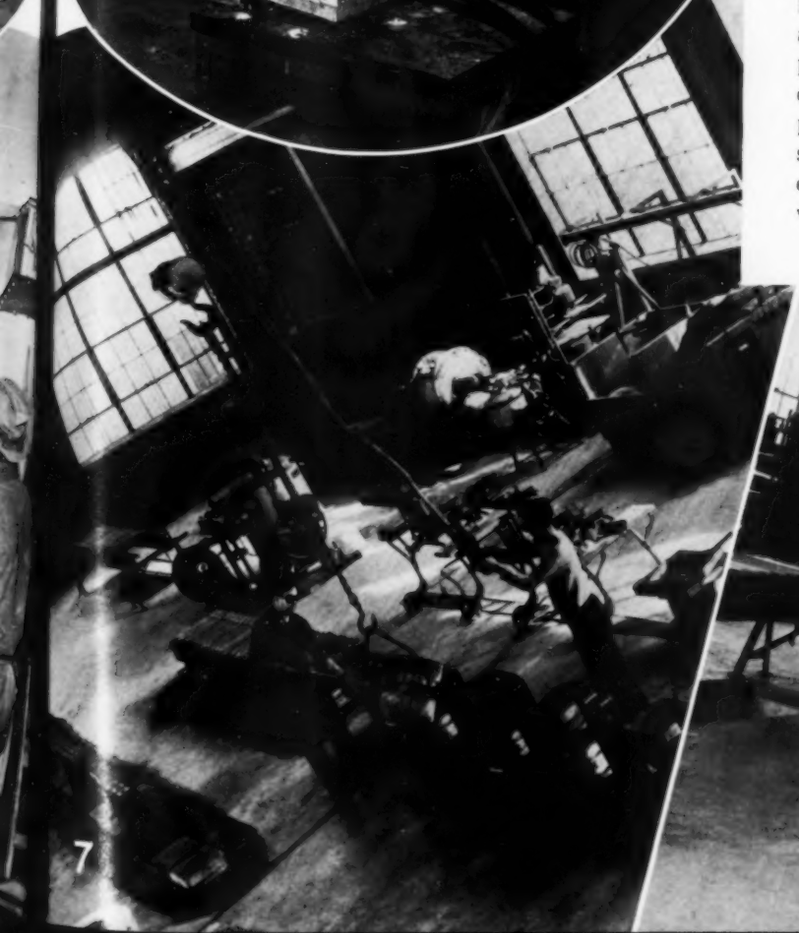
NEW FOUNDRY
DEVOTED
TO
Research



A NEW foundry, which will be devoted entirely to research problems in the field of cast products, recently was completed and placed in operation by the International Nickel Co., at Bayonne, N. J. While that company has been active in developing and improving foundry products for a number of years, and appreciable foundry research facilities have been available for much of the period, the equipment was located in four different buildings, some of which were used for production purposes.

Increased demands on the foundry research staff, increased needs for additional foundry space, and the desire to separate research investigations from the commercially operated units suggested the desirability of a foundry research building large enough to encompass all of the foundry interests and sufficiently well equipped to carry out the investigations on a small plant scale. Research investigations carried out in special types of furnaces or under ideal laboratory conditions may offer a serious problem in transferring valuable information, thus (*Please turn to page* 98)



Use of Too Much Binder Is Cause Of Scabs on Casting Surface

Recent change from a pitch binder to a certain proprietary binder resulted in a severely scabbed surface on the drag side of a cast iron plate 2 x 3 feet, 2½ inches thick with three heavy ribs on the cope side. The mold is skin dried. We used the same facing with the pitch and with the other binder, one part binder to 20 parts sand.

Our first reaction to this inquiry is that with any fairly open sand there should be no necessity of skin drying the mold. Green sand facing containing coal dust in the proportion of 1 to 8, aided by a coating of plumbago applied by brush or bag, should strip from the casting perfectly. Without entering into an analysis of all the factors responsible for the decision we are inclined to the opinion that your sand is too tight, or in other words lacking in permeability for casting a slab 2 x 3 feet, 2½ inches thick. In regard to the two binders it is apparent that the proprietary binder is much stronger, or has higher bonding strength than the pitch compound formerly used. Also under some conditions the pitch may soften or get *caramel-like* and close up the sand.

The obvious remedy is to use a smaller amount for a given amount of sand. Any binding agent can be used in the facing for a skin dried mold, but the amount will depend on certain characteristics of the binder. Before shifting from one to another, the prudent man will make two or three small open sand molds. Face them with sand mixtures containing minimum, medium and maximum amounts of the binding agent. Fill the molds with iron and closely watch the behavior of the metal in the liquid state and after the castings have cooled. With knowledge gained in this manner you should have no trouble in deciding on the mixture most suitable for your purpose.

Polished and Buffed Surface Is Desired on Aluminum Alloy

We will appreciate information on a good aluminum alloy for castings which are to be polished and buffed.

Since you do not place any other limitations on the desired aluminum alloy except that it be castable and capable of being polished and buffed, we believe that the regular No. 12 alloy or one of its several variations, or the 5 per cent silicon alloy will answer your requirements.

In your case the particular alloy is not nearly so important as the procedure in handling it to obtain a satisfactory product. First, your sand should be selected on the basis of the size and weight of the casting, or castings to be made. If that sand is not fine enough to provide the required smooth surface, then you will have to employ in addition, a much finer sand for facing. However, we believe that your castings are small or medium in size so that the sand selected probably will provide a satisfactory, smooth surface on the casting.

Considerable care must be exercised in melting to eliminate any trouble from pinholes which are present due to gas absorption. Pouring range of aluminum alloys may be from 1250 to 1500 degrees Fahr. for extremely thin sections, and it always is advisable to pour at the lowest possible temperature which will give a sound casting. Therefore, it is wise to determine the best pouring temperature for the castings, and then add 50 to 75 degrees to that temperature as the optimum melting temperature. When the metal has reached the desired temperature in the furnace, it should be removed and poured into castings. Under no consideration should the metal be permitted to stew in the furnace for any length of time at a high temperature for that will permit absorption of gases of combustion which later show up as pinholes on the surface, or just under the casting skin.

Cores in Bushings Vertically Cast Are off Center at Top

We are casting bronze bushings 12 inches in length with cores from ½ to 3 inches diameter The patterns are provided with core prints top and bottom. The mold is made in a three part flask and the castings are gated a the bottom. The sprue is raised in the center 12 to 15 inches above the top of the castings to provide pressure. In many of these castings we find the core off center at the top.

Only two reasons are responsible for off center cores. The first is ill fitting flask pins and the other is cope prints in which the cores do not fit snugly. There is a possibility in some instances that both factors may be present. Another possibility is that the prints are off center on the patterns. However, in the present instance that possibility may be dismissed since only a certain number of the castings are defective. If the pattern was not true, all the castings would go to the scrap pile. You do not state how the molds are made, that is whether loose patterns are used and the molds rammed by hand, or if pattern equipment is attached to three separate plates and the different parts of the mold rammed on three

machines, drags on one machine, cheeks on a second and copes on a third.

Logically if patterns are constructed accurately, flask pins fit tightly, and cores rest properly in the prints, the holes in the resulting castings should be exactly in the center. If a check on these features discloses nothing wrong, then obviously one must look elsewhere. If you are using special cores properly tapered top and bottom to match the prints, it may be well to check the total length. If the core is a little short the top print will not fit tightly in the print in the cope, but will tend to lean a little to one side.

However, basing an opinion on long experience we are inclined to the view that you probably are using straight pieces of stock core. These are cut to length by the molder and either left straight at the top, or are tapered by hand. If they are left straight he will ease the print in the cope to allow them to enter. If he tapers them by hand with an old file, the taper may not be true. In either case there is a chance for error in the fit.

Pits in Flat Iron Bases Show Through Chromium Plating

On some of our chrome plated bases for electric irons we find scattered small pits. Molds are made face down from a pattern plate with four patterns gated at the square end. Iron conforms to the following approximate analysis: Combined carbon, 0.51 per cent; graphitic carbon, 3.18 per cent; manganese, 0.72 per cent; phosphorus, 0.27 per cent; sulphur, 0.092 per cent, and silicon 2.00 per cent.

All we can offer on this problem is a theory. The sand in some instances is just a shade damper than in other instances and sends up a few minute jets of steam when the face is covered with molten iron. These jets, almost microscopic in size, intensity and duration, form small pits in the face of the casting and of course the pits are reproduced in the chromium, or for that matter, any other type of plating. Presumably the castings are finished in an automatic type continuous grinder. Possibly they are not examined critically after they leave the grinder, but are presumed to be perfect. Two courses of action are open, one preventative and the other remedial in character. Success of one, of course, renders the second unnecessary.

Adjust the moisture and clay content of the sand so that the metal will lie on it perfectly quiet. Possibly it may be necessary to provide more generous exit for gas and steam in the drag. The second or remedial measure applies to castings that show pits in the face after the first passage through the grinder. A second pass through the machine should clear up the face on any casting worth salvaging.

Another possibility is that with the comparatively high total carbon you have, the graphite may be coarse and torn easily from the matrix. Two solutions are available in that case. One is to change the mixture, and the other is to change the grain or grade of the grinding wheels.

Bronze Pressure Flange Leaks Under Testing Conditions

The piece of bronze pressure flange we are submitting gives considerable trouble with leaks when subjected to air pressure under water. Castings are made from new ingot metal 85-5-5-5, and have added nickel-copper shot in various quantities up to 1½ per cent nickel. Metal is melted in an oil-fired, crucible-type furnace. We have tried charcoal and glass covers. Pouring temperature is 2000 to 2100 degrees Fahr., by pyrometer measurement. Sand has been tested and pronounced satisfactory.

Appearance of the casting leads to the opinion that the metal may have absorbed gas during melting, but there also is the possibility that the sand used in molding was too high in moisture. We believe your difficulty is due to a combination of those two faults. One possibility of gassing is preheating the ingots preparatory to melting. Bear in mind that if you preheat them in the furnace flame, they may absorb reducing gases even though the ingots do not become molten. The discolored fracture indicates the presence of gas, either from the sand being too wet, or absorbed during melting.

A temperature of 2100 degrees is somewhat high for medium or heavy section pouring. However, presence of a reducing atmosphere is the most likely cause. Try to keep a neutral flame throughout melting, and finish with a sharp flame. Addition of some copper oxide about 10 minutes before pouring may help materially. Another possible cause which should be kept in mind is improper gating or insufficient feed, or both.

Cast Iron Gun Barrel Cooled On Inside by Water in Pipes

In an article which appeared recently in THE FOUNDRY, the author, Col. Norman F. Ramsey, Rock Island arsenal, Rock Island, Ill., refers briefly to, and shows an illustration of the mold for an old time cast iron gun in which water was used to cool the barrel. Do you know if the water ran continuously through the center of the loam core, was the core barrel filled with water, or was a stream of water simply poured through the center of the core before the iron entered the mold?

About 1860 Gen. Rodman, chief of ordnance, United States army, conceived the idea of casting heavy guns hollow and cooling them from the inside by circulating a stream of cold water in the bore while the outside was kept at a high temperature. This method placed the inside metal in a state of compression and that on the outside in a state of tension, the proper condition to withstand successfully the pressure of the powder gas which tends to expand the inner portions beyond the normal diameter and throw the strain on the supporting outer layers. The method was in use for several years until superseded by the built up steel gun.

Considering the mechanical and other facilities available at the period, several foundries, for example The Norway Iron Works, now the Hunt-Spiller Mfg. Corp., Boston; and Builder's Iron Foundry, Providence, R. I., established remarkable records in

melting the metal, in molding, casting and machining these heavy pieces of ordnance. The loam core was built on a cast iron barrel closed at one end and suspended from the other end by a suitable yoke which held it rigidly in the center. The upper end was capped and provided with suitable pipe connections for circulating a stream of water. The inlet pipe extended to a point close to the lower end of the barrel. The stream of water was turned on before the iron entered the mold and was allowed to flow continuously during the casting period and for one or two days thereafter, depending on the size of the casting. In modern foundry practice the method occasionally is employed where steel pipes are enclosed in a casting. A necessary precaution is to have the water flowing through the pipe before the iron enters the mold.

Pinholes Appear in Brass Casting

We are sending a small brass casting, which has an average metal thickness of ⅛-inch except for a stem projecting from one side which is ⅜-inch in diameter, and ¾-inch long. The trouble with this casting is a small pin hole which you will observe on the stem. Castings are molded eight to a gate and we get about 90 per cent good castings. We use virgin metal to provide an 85-5-5-5 alloy, and the castings are poured at about 2000 degrees Fahr. We use No. 1 Albany sand, and at times employ a proprietary brass flux and charcoal. Melting time is about 2½ hours and we employ coke as a fuel.

Examination of the casting revealed the small hole in the stem, and led to the surmise that it might come from gassy metal. Closer examination with a low power magnifying glass showed numerous other fine pin holes on the machined surfaces.

The pin holes in the thinner sections, of course, were very fine, but similar in appearance to the larger pin hole in the stem. Reason for that of course is that the thin section solidified considerably faster than the heavier section of the stem and did not give the gas a chance to collect into larger globules. While we note that you mention that you obtained 90 per cent good castings, we believe that a close examination of the surfaces of the good ones with a magnifying glass would reveal fine pin holes.

Since the trouble is laid to gassy metal the next point to decide where or why it occurs. You mention that it takes about 2½ hours to melt your metal and we believe that such a period is much too long. Since the longer the molten metal is subjected to gases of combustion, the more it will absorb. Therefore, it is suggested that you open up the flues and grates, so that you will secure more rapid combustion. We believe that by making suitable changes, you can reduce your melting time to 2 hours starting with a cold furnace, and succeeding heats will of course be melted more rapidly. It might be pointed out also that the alloy in question is quite susceptible to improper sand conditions, and suggest a careful study of that phase.

Small Bronze Wheel Shows Defects

We are forwarding a section of a bronze trolley wheel. There seems to be a drawing tendency around the gates as well as a general porous condition. We would like to know the cause of these faults and their remedy. We enclose a sketch of the matchplate. Analysis of the metal shows 89.10 per cent copper, 6.0 per cent tin, 3.0 per cent zinc, 1.25 per cent nickel, 0.50 per cent lead and 0.15 per cent phosphorus. We have made thousands of these wheels in the past with normal losses, but now our losses are in the neighborhood of 30 per cent.

We believe your difficulty essentially is one of gas absorption due to improper melting. That opinion also is being borne out by the fact that you mention you have produced thousands without any particular difficulty, indicating that your practice outside of melting has been satisfactory. Porous condition shows up mainly in the bottom of the groove at the point where the casting has the heaviest section, and is not so pronounced on the thinner sections of the wheel. That is due to the fact that the quick freezing sections of the casting do not permit the gas to come out of solution while the heavier sections do give the gas a chance to collect into larger bubbles as it were. The effect still is more pronounced in the vicinity of the gates where the metal remained in a partially fluid or plastic state for a considerable length of time, and hence permitted a greater accumulation of gas.

We do not have any doubt that your trouble will be eliminated if you give close attention to your melting practice, and see that your metals are melted under slightly oxidizing conditions. Adjust your oil burner so that you are obtaining what is known as a sharp flame. In other words, cut down on the oil or increase the air. We note that in the sketch of the matchplate you are using, you are pouring the wheels two up. We wonder if you have tried gating from the center so that only one ladle would have to be used for pouring. Your attention also is called to the possibility of poor feeding through the present arrangement, and also it is suggested that you try pouring some of the castings at a higher temperature than you now are employing.

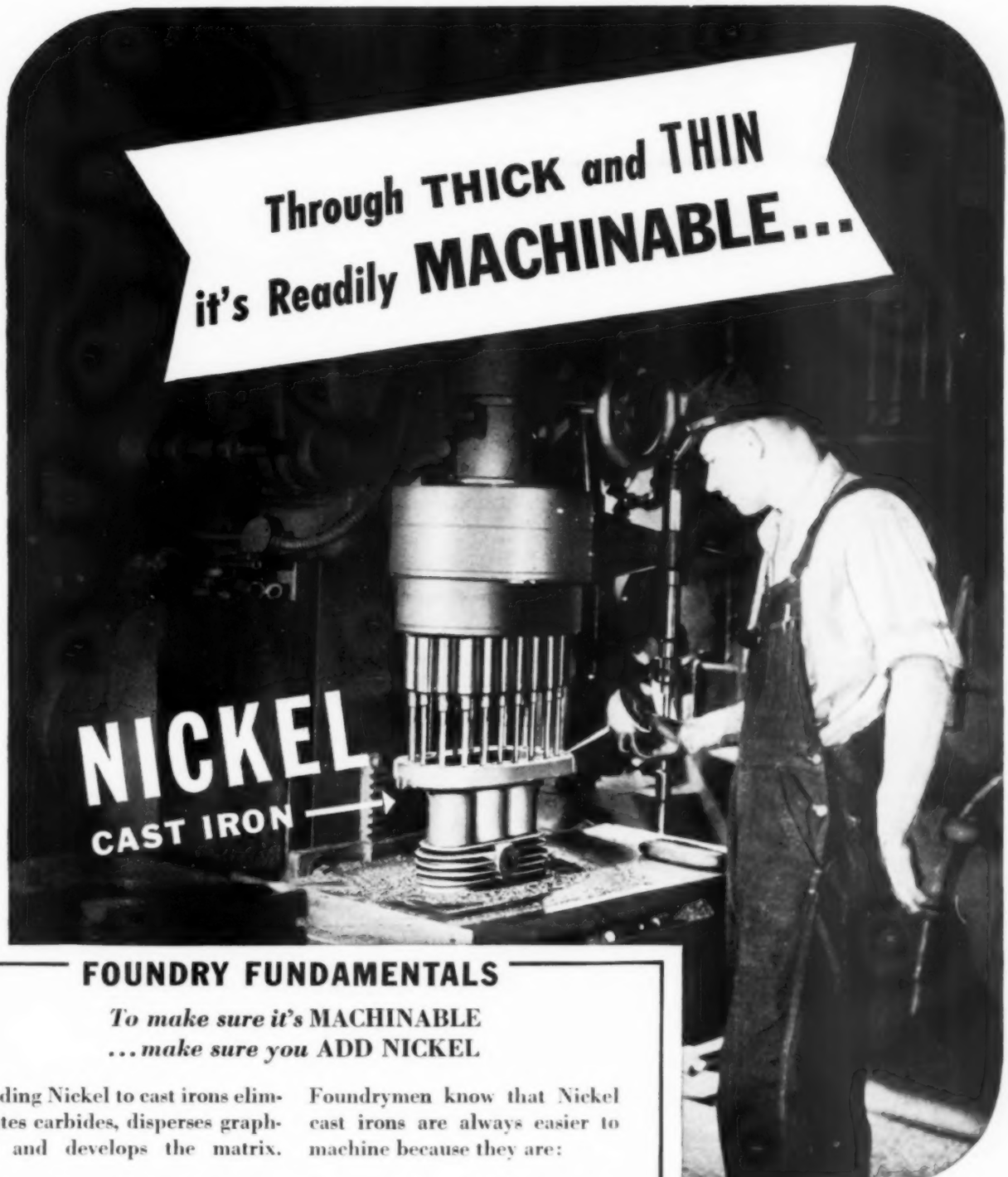
Green Sand Core Is Swept on Arbor

We have trouble with green sand cores swept on cast iron arbors for pipe 11 inches inside diameter, ⅜-inch thick and 6 feet in length. The arbor is pierced with vent holes and carries longitudinal fins for supporting the sand which is thrown against it by hand and cut to shape with a longitudinal horizontal sweep. We have tried a stationary and a movable sweep. With the stationary sweep the castings are fairly satisfactory, except that occasionally swells appear on the inside surface. Where the sweep is moved backward and forward the casting is heavily scabbed on the inside. Cores are slicked with a trowel and blacked.

The proper method for making green sand cores for pipes is that in use for many years in the soil pipe foundries. The arbor is mounted in bearings in a device which also carries a stationary sweep at the half way line. A hopper filled with sand is mounted from 4 to 6 feet above the arbor. The height varies according to the character of the sand and readily can be determined by experiment. As the arbor revolves either by hand or mechanical power a reciprocating screen is set in motion in the long narrow opening in the bottom of the hopper and steady stream of sand falls on the arbor.

The sweep cuts this sand to the desired shape. With this device the sand is packed uniformly to the desired density. There is no need of slicking or blacking the core. Your trouble with the stationary sweep is that the sand is not packed uniformly. On the under side of the core where pressure is most severe, the iron pushes into the soft areas with resulting swells on the inside of the casting. The movable sweep makes the sand too hard.

The sand is not thrown against the barrel, but is pressed against it with the hands. A nice sense of feel must be developed to insure uniformity and density, particularly on the part which lies lowest in the mold where the iron pressure is greatest. A handful of shavings or oily waste is lighted inside each end of the arbor immediately before iron enters the mold. If the first gas is not ignited it will unite with the air in the barrel to form an explosive mixture and will dislodge some of the sand on the arbor. Go lightly with the clay wash, or omit it altogether.



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1 ***Free from chill and hard spots even on edges and thin sections.***

2 ***Free from porosity, shrinkage and open grain that cause costly rejects during and after machining.***

3 ***Dependably uniform in hardness and structure through thick and thin sections.***

4 ***Of maximum machinable hardness.***

5 ***Fine grained and mirror-smooth finish.***

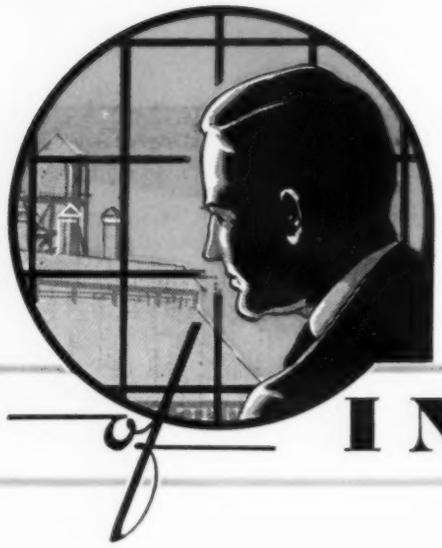
Photo courtesy of York Ice Machinery Corp., York, Pa.

Casting cylinder blocks or other patterns with sections of varying thickness, a foundryman's first thought is machinability. From long experience, he depends upon Nickel, Nickel alone or in a balanced combination. He knows Nickel added to cast iron assures increased machinability and uniformity of structure.

• • •

Consultation on prob'ems involving Nickel is invited.

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET NEW YORK, N. Y.



MEN of INDUSTRY

WILBUR R. VARNEY has been appointed metallurgist, Taylor-Wharton Iron & Steel Co. with plants at Easton, Pa. and High Bridge, N. J. Mr. Varney was graduated from Northeastern university, Boston, in 1937 where he was a co-operative student 4 years in the metallurgical department of the Hunt-Spiller Mfg. Co., Boston. He obtained a master of science degree in 1938 from Rensselaer Polytechnic institute through a graduate fellowship in metallurgy. For the past two years, Mr. Varney has been associated with the Bethlehem Steel Co.

♦ ♦ ♦

A. M. ONDREYCO, formerly chief metallurgist, Meehanite Metal Corp., Pittsburgh, has been made assistant superintendent of the Cooper-Bessemer Corp., Grove City, Pa. Mr. Ondreyco was graduated from Carnegie Institute of Technology, Pittsburgh, and then became chemist with the Firth Sterling Steel Co. Later he spent 4 years with the United States bureau of mines and 1 year as metallurgist for the New Process Copper Casting Co. From 1924 to 1934 Mr. Ondreyco was operating metallurgist and advisor for the Westinghouse Air Brake Co., Pittsburgh, and in 1935 became connected with the Meehanite Metal Corp. During 1938 and '39 he was in charge of the work of that organization in Australia. He is a past president of the Pittsburgh Foundrymen's association.

♦ ♦ ♦

L. M. NESSELBUSH recently was made a director and vice president of Falcon Bronze Co., Youngstown, O., succeeding the late R. H. Doeright who had been vice president of that company practically since its organization 50 years ago. Mr. Nesselbush has been sales engineer of the Falcon company for a number of years, and has been connected with that organization since 1925. He was graduated from Lehigh university in 1920 with a degree in metallurgy. At present he is a major in the army reserve assigned to the 42 infantry regiment, a tank outfit. DAVID A. ENDRES also has been elected to the board of directors succeeding the late C. H. Kennedy.

♦ ♦ ♦

HAROLD W. HERSHEY has been made an instructor of foundry and patternmaking in a new vocational school at Rochester, N. Y. Mr. Hershey was born in Ontario county, N. Y. and received his early education in the public schools of Rochester. At the age of 16 he went to work as a coremaker and molder apprentice at the American Laundry Machine Co., Rochester, and remained in their employ for 3 years. In 1925 he entered the employ of the Gleason Works, Rochester, as patternmaker apprentice and completed the 4-year apprenticeship course there and remained with that company for 12 years as patternmaker. During that period Mr. Hershey attended evening school where he finished his high school training and took teaching preparation courses. By securing leaves of absence during summers, he attended Oswego State Normal school and obtained his teaching degree. In 1937 he accepted a position to teach foundry and patternmaking in Vocational High school, Syracuse, N. Y., and while there attended Syracuse University Extension school evenings and took work toward his degree.

♦ ♦ ♦

IRVIN A. BRINKMAN, Mackintosh Hemphill Co., Pittsburgh, has been elected general chairman of the executive committee, metals section of the National Safety council. Other members elected include vice chairman H. J. SPOERER, Youngstown Sheet & Tube Co., East Chicago, Ind., and R. H. FERGUSON, Re-

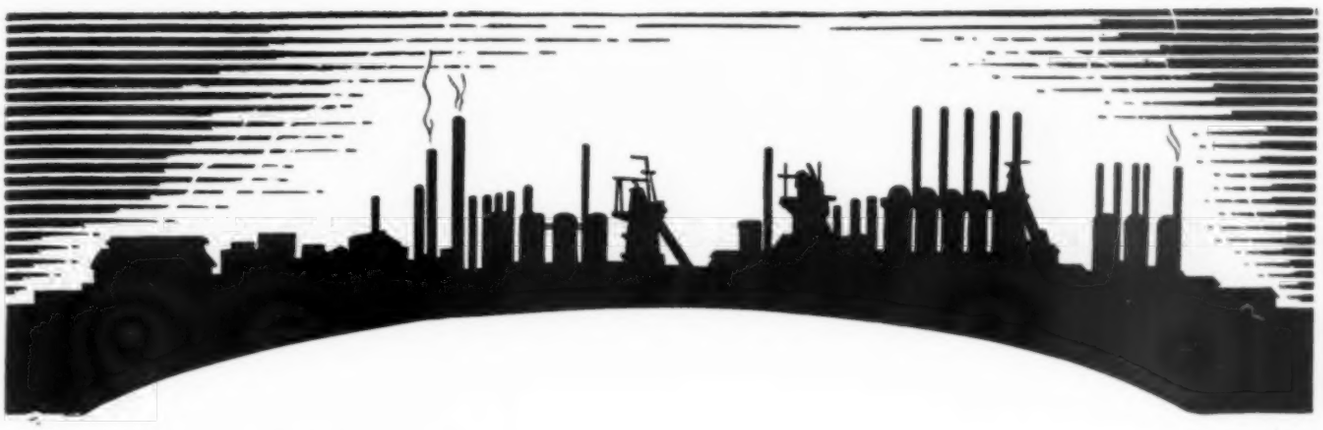
(*Continued on page* 56)

L. M. Nesselbush

A. M. Ondreyco

Harold W. Hershey

Wilbur R. Varney



Woodward

PIG IRON

and

Dependability

WOODWARD IRON COMPANY
WOODWARD, ALABAMA

America's Largest Completely Integrated and Entirely Independent Merchant Iron Producer

(*Continued from page* 54)

public Steel Corp., Cleveland, and secretary and news letter editor JOHN P. O'ROURK, Bethlehem Steel Co., Sparrows Point, Md. Foundry committee consists of Chairman J. H. HOLZBOG, Chain Belt Co., Chicago, and H. S. SIMPSON, Caterpillar Tractor Co., Peoria, Ill.

♦ ♦ ♦

ALFRED S. OTTON recently was appointed advertising manager, the Robins Conveying Belt Co., Passaic, N. J. He will be assisted by E. E. RICHES and JOHN M. LUPTON. Mr. Otton has been connected with the Robins company since 1937, and recently was in charge of screen cloth sales. He formerly was associated with the late William L. Fewsmith, for many years director of advertising and publicity for the Robins company. Mr. Riches has been with both the engineering and preliminary design departments of that organization, and Mr. Lupton recently joined the company with a background of experience in advertising and printing.

♦ ♦ ♦

W. M. BLACK recently has been appointed president, American Manganese Steel division, American Brake Shoe & Foundry Co., Chicago. Mr. Black became general sales manager of the division in 1934 and a vice president in 1935. He has been with the organization since 1912, except for a period during the World war when he served as a lieutenant in the United States ordnance department. W. E. CROCOMBE, formerly head of the American Manganese Steel division, continues as president of the American Forge division of the company.

♦ ♦ ♦

C. E. BALES, vice president, Ironton Fire Brick Co., Ironton, O., recently was elected president of the Ohio Ceramic Industries association at a meeting held at Ohio State university, Columbus, O. Other officers elected by the association are as follows: HARRY CALLAHAN, U. S. Quarry Tile Co., Canton, O., vice president; E. E. HILLYER, Clay City Pipe Co., Uhrichsville, O., treasurer; and PROF. H. E. NOLD, Ohio State university, Columbus, secretary.

♦ ♦ ♦

P. A. PAULSON, metallurgist, Gunite Foundries, Rockford, Ill., is chairman of the Northern Illinois-Southern Wisconsin Chapter of the A. F. A. Mr. Paulson was born in Rockford and received his early education in that city. He attended Augustana college, Rock Island, Ill., and following graduation was employed as chemist by the Illinois Steel Co., South Chicago, Ill. A year later he returned to Rockford to become chemist for the Rockford Malleable Iron Works. Mr. Paulson then spent 2 years on the West coast, one year as chemist for the Pacific Malleable Castings Co., Oakland, Calif., and the second year as chemist at the Warman Steel Castings Co., Los Angeles. He returned again to Rockford, and since 1929 has been associated with the Gunite company.

♦ ♦ ♦

ANDREW NELSON recently has been appointed salesman and special demonstrator in the Chicago territory for the Werner G. Smith Co., Cleveland. Mr. Nelson served his apprenticeship as a coremaker and molder from 1910 to 1918 in Minneapolis, Seattle and Tacoma, Wash. From 1918 to 1925 he was core foreman at the Emerson-Brantingham Co., Rockford, Ill., and general foundry foreman in the tractor foundry. The following 4 years he was associated with the Northwestern Malleable Iron Co., Milwaukee as coreroom supervisor. From 1929 to 1932 Mr. Nelson was coreroom supervisor at the Ironton plant of the Dayton Malleable Iron Co., and for the following 4 years supervised rigging for production with core blowing machines in all of the plants of the Dayton Malleable company. From 1936 to 1938 he was connected with the Smith Oil & Refining Co., Rockford, Ill., and from 1938 up to his recent appointment, Mr. Nelson was employed by the Auburn Foundry Co. of Auburn, Ind., as in charge of the core room. Mr. Nelson will continue to reside at Rockford, but will make his headquarters at 520 North Michigan avenue, Chicago.

♦ ♦ ♦

RAY R. TOEPEL recently has been named sales manager, Brillion Iron Works, Inc., Brillion, Wis.

♦ ♦ ♦

ALFRED KAUFFMANN, president, Link-Belt Co., Chicago, is celebrating his fortieth year with the company. Mr. Kauffmann began his career with the organization in 1901 as an engineer.

♦ ♦ ♦

J. RAY MATHEWS recently was appointed sales representative of the E. J. Woodison Co., Detroit in Western New York. Mr. Mathews will operate from the Buffalo district office and will make his headquarters in Syracuse.

♦ ♦ ♦

JACKSON H. BEYER, recently has been appointed to the nonferrous metallurgy division, Battelle Memorial institute, Columbus, O. Mr. Beyer is a graduate of the University of Wisconsin, Madison, Wis., and is a member of the American Institute of Mining and Metallurgical Engineers.

♦ ♦ ♦ ♦

JOHN C. PHELAN, newly elected president of the New Jersey Foundrymen's association, has been affiliated with the foundry industry for the past 40 years. His association began when he joined the Benjamin Eastwood Co., Paterson, N. J., in 1900, a company which he has been connected with ever since and which he is now vice president. Prior to his recent election, he had been vice president of the New Jersey Foundrymen's association for

(*Concluded on page* 58)

C. E. Bales

P. A. Paulson

W. M. Black

Andrew Nelson

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Company _____ State _____

City _____

Truline Binder comes to you as a uniformly pulverized powder, in clean convenient-sized paper bags, easy to handle. It mixes readily with green, dry, or reclaimed sand. The core-sand mix has low green strength, rams quickly, allows you to turn out *more cores per hour.*

Interested? Read on . . .

● Truline Binder bakes quickly to a strong bond, because it fuses and hardens and does not require air to develop bond. You get good cores, with excellent dry strength, that stand up to the action of hot metal with minimum cutting and washing. And, incidentally, you can often use high proportions of reclaimed sand. The real meat here is that *baking times are sharply cut.*

That's not all . . .

● Truline Binder loses its bond, sharply, above 650°F. Thus, cores collapse and disintegrate as the heat of the casting gets into them. The result is easy knockout and a big reduction in cleaning time. Thus, you can *move much faster on the cleaning floor.*

● The final touch of speed is gained because, with Truline-bonded cores that collapse in time, your castings can shrink freely. Rejects due to shrinkage-cracks are held to a minimum, *further increasing your production.*

Truline Binder is doing these things for others right now.

Any or all of these benefits may be realizable in your own foundry operations. If you're interested in more good cores and castings per man-hour from your present equipment, write for full information and a trial amount. Or better still, ask us to demonstrate Truline Binder—the new-type bonding agent—right in your own plant.

USE THE HANDY COUPON

JJ-36

NAVAL STORES DEPARTMENT
HERCULES POWDER COMPANY
Incorporated
WILMINGTON, DELAWARE

BRANCH OFFICES: NEW YORK • CHICAGO • ST. LOUIS • SAN FRANCISCO • SALT LAKE CITY

(*Concluded from page 56*)

the past 2 years and a director for several years. He also is a director of the New Jersey State Industrial Safety committee. In addition to his interests in the foundry industry, Mr. Phelan is president of the Battie Building & Loan association, Paterson, and vice president of the Cardinal club, of that city. He was born in Ontario, Canada, and was educated at Canisius college, Buffalo.

♦ ♦ ♦

M. A. BELTAIRE JR., Detroit, has been appointed representative of the Royer Foundry & Machine Co., Kingston, Pa., in the Detroit district.

♦ ♦ ♦

H. J. BERMAN recently has been made works manager, A. J. Lindemann & Hoverson Co., Milwaukee, Mr. Berman formerly was associated with Edison General Electric Co., Chicago. H. F. MUENCHOW formerly acting superintendent, has been appointed superintendent, and PAUL GERDES has been placed in charge of the enameling and stamping division.

♦ ♦ ♦

W. C. DOEMEL, formerly manager, Webster Mfg. Inc., Tiffin, O., has been appointed superintendent, Vulcan Mold & Iron Co., Latrobe, Pa. Mr. Doemel will be in charge of the company's manufacturing operations. R. T. DUNLAP, who until a few months ago was superintendent, is resigning Jan. 1 to become works manager, Vulcan Iron Works, Wilkes-Barre, Pa.

♦ ♦ ♦

D. M. STORIE, general foundry superintendent, Fittings Ltd., Oshawa, Ont., is the chairman of the Ontario Chapter of the A. F. A. Mr. Storie was born in Oshawa and attended public schools in that city. In 1924 he was employed by Fittings Ltd. and placed in the drafting department. The following year he was made a patternmaker and 2 years later became a foundry clerk. Mr. Storie was put in charge of foundry training in 1928 and was made gray iron foundry foreman a year later. He was transferred to the malleable foundry as foreman in 1932 and since 1934 has been general foundry superintendent.

♦ ♦ ♦

C. M. SAYRE has been appointed production manager and HAL W. FORSEY has been named controller of the Enterprise Foundry Co. and its engine and oil burner divisions, San Francisco. Mr. Sayre formerly was connected with Westinghouse Electric & Mfg. Co., where he was engaged in production work for over 18 years. Mr. Forsey previously was with Rosenberg Bros & Co., Oakland, Calif., where he was office manager and controller.

♦ ♦ ♦

CRAIG A. MILLS recently joined the Lakeside Malleable Castings Co., Racine, Wis., as plant engineer. Mr. Mills was born and raised in Milwaukee and was graduated from Marquette university with a degree of bachelor of science in chemical engineering. He then became employed as a co-operative student in the metallurgical department in the J. I. Case Co., Racine. In December, 1938, he became connected with the Carnegie-Illinois Steel Corp., South Works, as an apprentice engineer.

♦ ♦ ♦

M. F. DOTY, manager, casting division, Clark Equipment Co., Buchanan, Mich., is chairman, Michiana Chapter of the A. F. A. Mr. Doty was born in Hartford, Conn., and is a graduate of Columbia university, New York. In 1905 he was employed by the Lukens Steel Co., Coatesville, Pa. as cost accountant, and in 1909 became sales and production manager at Isaac G. Johnson & Co., Spuyten Duyvil, N. Y. From 1917 to 1920 he held a similar position with the Michigan Steel Casting Co. when he joined the Melvin Doty Co., Detroit, as sales engineer. In 1936 he became connected with the Clark Equipment Co. In addition to membership in the A. F. A., Mr. Doty is also a member of the Society of Automotive Engineers and the Steel Founders Society of America.

♦ ♦ ♦

H. F. MCFARLIN who recently was elected chairman of the Cincinnati chapter of the A. F. A., is superintendent of the iron and steel foundries of the Lunkenheimer Co., Cincinnati. He was born in New Castle, Del., on July 8, 1895, and received his education in the public and high schools of that city. In 1914 he joined the Deemer Steel Castings Co., New Castle, Del. as a general apprentice, and remained there until 1920. Mr. McFarlin later served as converter foreman with the Bayonne Steel Casting Co., Bayonne, N. J., and in the open hearth department of Penn-Seaboard Steel Corp., New Castle. In 1923 he became assistant foundry superintendent of Wm. Wharton Jr. & Co., Easton, Pa., and in 1932 was made melting foreman of Taylor-Wharton Iron & Steel Co., High Bridge, N. J. His present connection with Lunkenheimer Co., began in 1936.

Stove Makers Meet

Eighth annual convention and exhibition of the Institute of Cooking and Heating Appliance Manufacturers will be held Dec. 4 to 6 at the Netherlands Plaza hotel, Cincinnati. W. J. Cameron, Ford Motor Co., Detroit, will be the keynote speaker of the convention, talking on the place which small businessmen must hold in the industrial life of America.

American Foundry Equipment Co., Mishawaka, Ind., is expanding its office and factory facilities. Program includes a 19,000 square foot addition to its steel fabricating plant, a new storage plant and an enlarged office building.

D. M. Storie

M. F. Doty

H. F. McFarlin

THE 1% WAY TO MACHINABILITY

It is not particularly hard to get a medium cost cast iron combining good strength at elevated temperatures with good resistance to corrosion. Nor is it hard to get an iron that is readily machinable. But finding an iron with the requisite elevated temperature strength and corrosion resistance that is not difficult, or even impossible, to machine is another matter.

To this problem the simple addition of about 1.0% Molybdenum to a high silicon iron has been found an excellent solution. The resultant iron has the desired physical properties and at the same time is readily machinable. Smooth surfaces and threads can be produced with equal facility.

The iron is eminently suitable, both practically and economically, for such applications as hearth plates, glass molds, still tube supports and grate bars, where smooth surfaces or strong threads or both are important.

Our book, "Molybdenum in Cast Iron," contains technical data on these and other Molybdenum irons and their applications. A copy will be sent free on request.

PRODUCERS OF MOLYBDENUM BRIQUETTES, FERRO-MOLYBDENUM, AND CALCIUM MOLYBDATE

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MOLY

THE ADVENTURES OF BILL

By PAT DWYER

Drawings By RICHEY

EVERY time Bill visits me in the old red mill where I grind out copy for the insatiable maw of a monster that never is satisfied and constantly cries for more and more, he stands—probably I should insert an arrow here to indicate that the *he* is Bill and not the monster—he stands for a while and admires the group of artistic castings, part of the collection accumulated by the late John A. Penton over a period of many years.

"A truly great and remarkable man," said Bill. "More than any other person he made the great but formerly dumb foundry industry articulate. From an insignificant beginning he rose to fame and fortune. He associated with great men in this and in foreign countries and helped shape their policies. The French government elected him a chevalier of the legion of honor. He had significant tokens of approval from the great white father in Washington and was an active or honorary member in more American and foreign associations than—Well, I'll tell you. His obituary notices usually listed about a dozen and then gave up. Tacked on etc., and called it a day."

"In recognition of the fact," I said, "that he had devoted practically all of a long life that exceeded the traditional Biblical span of three score years and ten, to the advancement of the foundry and allied industries, the American Foundrymen's association and the Northeastern Ohio Chapter of the A. F. A. adopted formal resolutions to show appreciation of his efforts, respect for his memory and—in many instances—regret at the severing of a personal friendship.

"His life story is an example of what can be accomplished by a man with ambition, energy and the divine spark that never admits defeat. A huge frame and foundry hardened muscles enabled him in the early years to skip food, sleep and recreation for unbelievable periods while reaching for any desired goal. A human dynamo, he never spared himself and he never had any patience with the slipshod, the easy going, the lazy ones continually seeking the path of least resistance. Had he lived in a former period and under different conditions when the boys clanked around in iron suits, he would have been out in front, clothed in chain mail, bellowing a battle cry and swinging a great broad axe while he joyously mowed down the enemy in circles and windrows.

"Brought up in fairly affluent circumstances he looked forward to entering a university in preparation for a career in one of the learned professions. Adverse conditions knocked the props from under his father's business and forced the big, gangling, loose jointed youth to jump off the easy comfortable domestic dock and into the cold and turbulent waves of industrial life. He grabbed the first available job and learned the trades of molder and machinist in Sarnia, Ont. That will give you an idea of the size of the shop. Quite common practice in the smaller shops to shift the apprentices around. They were a kind of elastic link in the chain of production. When business was brisk in the foundry the apprentices worked as molders, coremakers, melters chippers and general handy men. If the machine shop was pushed, the apprentices easily could be set to watch a long cut on lathe or planer.

Candidate is given drop ball test

"He hurried through his apprenticeship and then roamed far and wide in the United States and Canada after the fashion of the young gay cats of the period. A few years later this experience furnished the background and material for a long series of articles in early editions of THE FOUNDRY dealing with the life of a tramp molder and with ordinary and curious experiences with people, shops, jobs, modes of travel and customs of the period. These articles presented under the title *James Chalmers, The Unvarnished Life of a Common Man* attracted a great deal of favorable comment and attention."

"I read them," said Bill, "shortly after I started to serve my time. Best stuff of the kind I ever read. Looking back now I believe they were a factor in my own case in getting out of the shop and hitting the road the day I was out of my time."

"Reading them recently, as I did, one is moved with admiration for the style and manner of presentation, and even greater admiration for the memory, fertile imagination and perseverance of a man who could produce these masterpieces under the adverse conditions prevailing at the period. He never admitted the authorship, but the foundry grapevine which knows all and tells twice as much, always has given him full and joyous credit.

"Reserved and dignified in later life as became the head of an important publishing house and with a long list of other social, business and miscellaneous connections, he found no trouble in relaxing in the presence of cronies, irrespective of whether they came with delicately manicured fingers from the front office of a bank or manufacturing plant, or came with the distinct aroma of core smoke on their clothes and with blacking from the shop under their finger nails. A

(*Continued on page* 62)

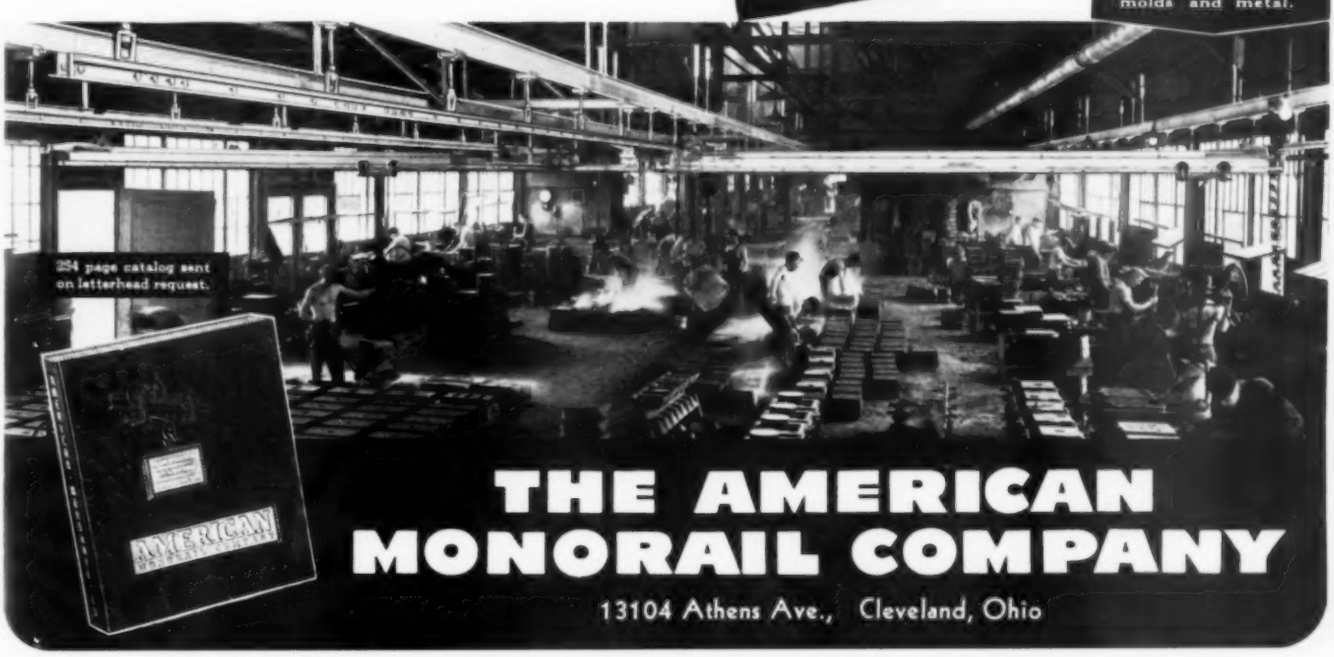
Simple Methods for stepping up Defense Production

With a surging demand for greater output, plants operating on defense materiel use every possible means to obtain it. It is no wonder that these plants are rapidly installing overhead handling equipment to relieve floor congestion...to gain time through process aids...or to conserve skilled manpower by eliminating handling fatigue.

Simple systems as shown here are quickly and inexpensively applied wherever a short cut is needed. American MonoRail engineers can spot these places in a short survey of your plant. They will then offer a detailed proposal which does not obligate you in any way. Why not give them a chance to help push along your defense production?

Free movement of trolleys prevents strain and speeds up distribution of metal.

Flexible track arrangement allows quick access to cupola and eliminates congestion



Interlocking cranes serve entire pouring floor for careful handling of molds and metal.

THE AMERICAN MONORAIL COMPANY

13104 Athens Ave., Cleveland, Ohio

(*Continued from page* 60)

true democrat he held to his friendships, his early associations and maintained a legitimate pride in the fact that in his early life he had been an active performer in the ranks of those who represent certainly the oldest and in many respects the most highly skilled of the mechanical arts. The mantle of reserve easily was shed. He was John to the old boys and they were Jim, Jerry, Tom, Dick and Harry as they were in the hilarious days when all were twenty one. In recent years when Art Congdon called in to see him twice a year on his annual easy north and south pilgrimage, the two of them would laugh like boys over episodes in a foundry in Hancock, Mich., where they worked together in the almost unbelievably remote year of '82.

"One quirk of fate made him a molder. A second quirk of the same fate lifted him out of the shop. However, and this is the station where many people with a similar opportunity miss the boat, he was ready, anxious and willing to be lifted. Charlie Gale touched off the fuse one day when he told the young molder that with his ambition, energy, fluency and other endowments, he should get away from the sand heap. Charlie was foundry clerk and John worked on the floor of the old Michigan Peninsular Car Works, better known in the Detroit district as the Slaughter House."

"I've heard of it," Bill said. "Ten oil boxes a day and make your own green sand cores and shake out your castings."

"The fiery young crusader took Charlie's advice. He organized the Brotherhood of Machinery Molders and broke away from the long established Molder's Union. Under the existing setup he felt that the machinery molders did not receive proper consideration in a body dominated by members engaged in the stove making branch of the trade.

"To further his efforts he published the *Machinery Molder's Journal* on which he was the editor, publisher, manager, writer, head of the subscription and advertising departments, janitor, night watchman and general contact man. In his spare time he wrote juicy, stinging, outspoken editorials calculated to raise large red mental welts on the hide of any opposition. In later life this early practice followed him into other fields and characterized all of his writing with particular and peculiar pungency, snap and vigor. He was a master of the one line paragraph long before the late Arthur Brisbane adopted the idea and made a fortune.

"A natural gift developed to a considerable extent through his effort as organizer made him a ready and fluent impromptu speaker. Highly cultured and widely read, the former tramp molder became known from one end of the country to the other. He had the happy faculty of spicing his remarks with happy and appropriate allusions and with flashes of the traditional wit inherited from an Irish mother.

"When the outlaw union, the red card men returned to the fold of the International Molder's Union, the *Journal* faded out of existence and left the publisher out of a job and up the well known Salt Creek without a paddle. The ordinary man under similar circumstances would have thrown up his hands and gone back to the shop. John was not an ordinary man and besides his brief experience as a publisher had given him a more comprehensive grasp of the potentialities of the foundry field than he would have gained in a life time of sand pounding. On his nerve and without a cent of assets or collateral he persuaded four Detroit business men, a lawyer, a school teacher, an insurance agent and a foundry supply man, to advance him the modest capital on which he established THE FOUNDRY, Sept. 1892. The supreme courage, optimism and confidence of the founder are reflected in the opening sentence of the first editorial. Here, listen to this under the title Salutatory:

We make our bow. What do you think of it?

It has been the wonder of thousands of foundrymen that the most important department of the world's most important industry—the iron industry—has never boasted a publication strictly its own. All others are more or less ably looked after by numbers of periodicals and trade journals, many of which possess much literary merit, are eagerly sought for and enjoy a high degree of prosperity. For some strange and unaccountable reason the foundry business has not even been in the rear of the processions, but out of it altogether.

The subject of a foundry paper is not a new idea. The attempt to supply the need is. Although always sanguine, we have been the recipients of such assurances and support from all over the country since it has become known that we contemplated this step as have surprised us beyond measure, and demonstrated more completely than anything else could at this time the existence of a universal demand for a paper whose sole object would be the advancement of foundry interests and all connected with therewith.

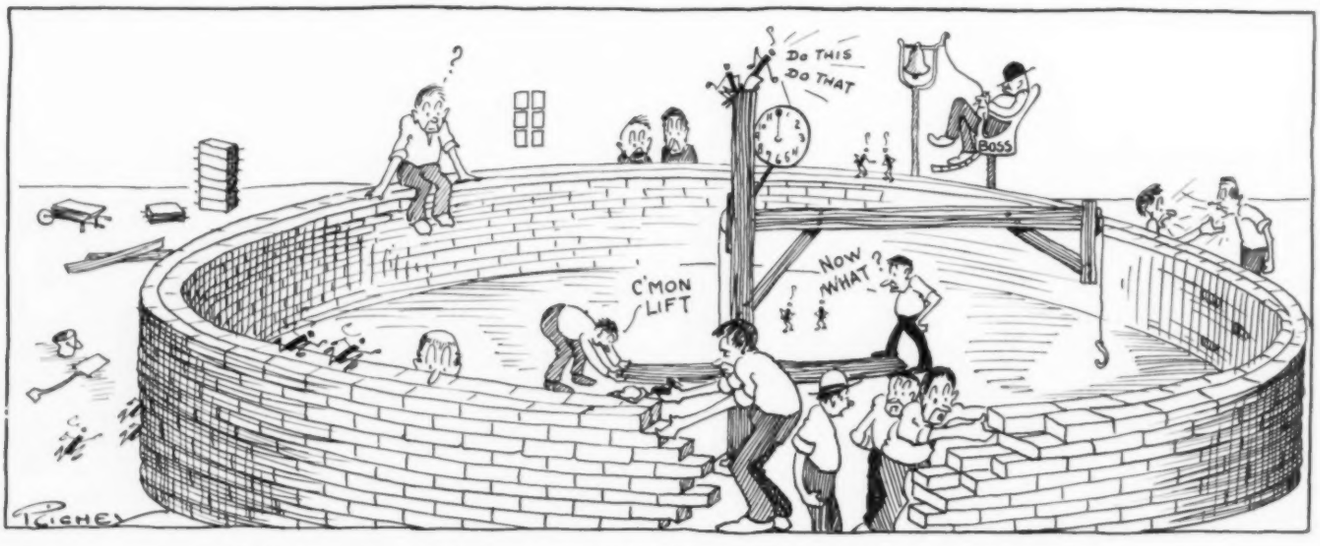
We have come to stay.

THE FOUNDRY is a winner and will, it is hoped, add one more to the already long list of prosperous trade publications for which America is noted. It proposes to become indispensable to every foundry proprietor, superintendent and foreman in the country who is desirous of keeping posted on current events, and to note the improvements constantly being made on present methods.

The ambitious molder will see that it reaches his home regularly, is carefully preserved for future reference. News items from all parts of America will receive particular notice, while mechanical articles by the best writers will be given the attention so necessary for a publication of this kind. As time goes on new features will be added, until nothing will be left to be desired.

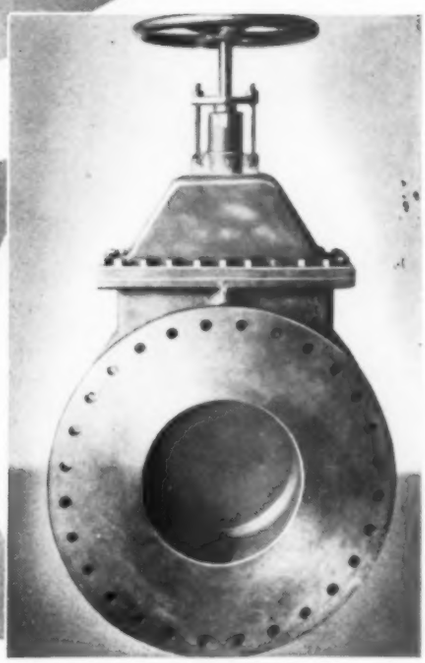
THE FOUNDRY will stand squarely for

(*Concluded on page* 96)



Croix de Quare at Joe's place awarded lad who used the old jib crane for a sweep

A 5-Star Favorite with Foundrymen ...Tin-Free Bronze Castings!



This 16-inch gate valve of cast Everdur weighs 2,000 pounds

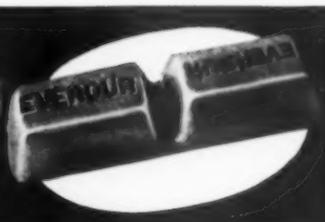
Here is a high strength copper-silicon casting alloy that compares favorably in physical properties to the tin bronzes. It's Everdur Metal, made by The American Brass Company.

For more than fifteen years it has been used successfully for the production of strong, sound castings. Moreover, this alloy is notable for its excellent resistance to corrosion, its fabricating qualities and its general ease of handling in the foundry.

Give us an opportunity to tell you more about this valuable alloy. We have a new bulletin describing in detail the casting qualities of Everdur Ingots. Ask us for a copy—no obligation. 40143

ANACONDA

(TIN-FREE) Everdur Casting Ingots



THE AMERICAN BRASS COMPANY, General Offices: Waterbury, Connecticut

In Canada: Anaconda American Brass Ltd., New Toronto, Ont. • Subsidiary of Anaconda Copper Mining Company

EVERDUR IS A TRADE-MARK OF THE AMERICAN BRASS COMPANY, REGISTERED IN THE UNITED STATES PATENT OFFICE

W. D. Hamerstadt
Re-elected president, National Founders' association

NATIONAL FOUNDERS Study Management Problems

NUMEROUS problems of management featured the forty-fourth annual convention of the National Founders' association held at the Waldorf-Astoria hotel, New York, Nov. 13 and 14. In the closing session of the convention, a resolution was passed pledging the co-operation of the association in every reasonable program of national defense, which will make the nation strong and thus enable it to be a real force in the preservation of world peace.

While deploring the trend of many recent court rulings, James A. Emery, general counsel, National Association of Manufacturers, said the recent United States Supreme Court decision in the Republic Steel Corp. case was salutary in many of its effects. The decision, which ruled Republic did not have to repay PWA for work relief wages paid to the company strikers, is remedial in character and not penal, he declared. It definitely outlaws, in his opinion, "mandatory blacklisting" of companies on defense work, due to charges by the board, not even proved in court, that they have been violating the Wagner law.

Expect Heavy Taxation

Pointing out that it is usual for this country to be behind in its defense preparations, Mr. Emery said that upon this occasion the United States is in far worse position financially than at the time of the World war, due particularly to the wasteful spending of the past 7½ years. This will mean especially heavy taxation to meet defense burdens. Consequently, he said, it behooved all to watch tax legislation closely, that such may be as effective as possible and be confined to legitimate needs.

He said that it is high time for a re-examinatian of the whole system of taxation, and he foresaw the day, judging from the present trend, when there will be a sharp conflict between local and federal governments over questions of taxation, which will prove greatly detrimental to the country.

As a solution to many labor problems in the critical period of rearming, Edmund M. Toland, Washington, formerly general counsel to the congressional committee investigating the national labor relations board, suggested a body similar to the war labor board in the World war.

"If the President by executive order were to create under his emergency power a bipartisan nonpolitical defense labor board with jurisdiction over industries vital to national defense; if the personnel of such board were to parallel the old war labor board; if such a board were to administer concurrently the various labor problems now spread throughout a number of various agencies, then some measure of order, some measure of unity might prevail, and our national defense program might go forward unimpeded by labor disturbances."

W. D. Hamerstadt, Rockwood Mfg. Co., Indianapolis, who was re-elected president of the association, devoted his remarks largely to a review of the history of the organization, emphasizing particularly its accomplishments in the labor relations field, safety work and in the promotion of sound foundry management and practice.

Speaking particularly of labor relations, he said: "Many feel they are helpless in this field; that the numerous restrictions imposed by law have made it impossible for them to carry out any of their own judgments. We hope these restrictions will be modified so as to make the laws and regulations fairer and more workable. However, the fundamentals of the labor problem remain the same—wages, hours and working conditions equitable to both management and the employes."

So far as present appropriations are concerned the order-placing phase of the defense program is nearing the end, according to Harry L. Coe, technical advisor, National Association of Manufacturers.

Substantial part of the three billions remaining for national defense is allocated rather definitely and the next few weeks will witness the rounding out of the program. Next general activity will be in connection with production of required materials and every industry, directly or indirectly, will feel the guiding hand of government more or less forcibly applied, said Mr. Coe.

Priorities will be extended, not only to divert materials and labor into defense industries, but also to insure necessary production for civilian requirements. On many commodities not now so regulated, export and import licenses may be expected and government financing in various forms will become more general. Mr. Coe also feels facilities for recruiting labor will be largely government controlled and increases in basic wage scales may be expected with governmental support.

To date the operation of priorities has been by voluntary co-operation and, according to Mr. Coe, the stronger trade associations have been of great assistance. Machine tools presented the first serious problem, but in almost every case the priorities committees of the army and navy have succeeded in working out a satisfactory adjustment without employing mandatory

(*Concluded on page* 66)

SANTA CLAUS IS SLY

HE BRINGS

COST-REDUCING EQUIPMENT

SHOPPING LIST FOR FOUNDRIES

SLY

- BLAST MILLS..
- BLAST ROOMS
- CENTRI-BLAST MILLS AND ROTARY TABLES
- DUST FILTERS
- TUMBLING MILLS

TO THE FOUNDRY INDUSTRY

Sincere appreciation from the Sly Family for your suggestions, your cooperation, and your purchases of Sly equipment.

S. C. VESSY, PRESIDENT

THE W. W. SLY MFG. CO.

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1874 *SIXTY-SIX YEARS OF SERVICE TO THE INDUSTRY* 1940

(*Concluded from page* 64)

authority. As the full impact of large orders begins to filter down through industry, the situation will undoubtedly become worse. Mr. Coe declared the priorities committee of the advisory committee is endeavoring to guide this policy with intelligence and foresight.

Mr. Coe explained in detail the various amortization plans available to smaller plants. There will be many instances in which manufacturers serve as subcontractors, or supplying items necessary for national defense without appearing as direct contractors on government orders. In such cases a manufacturer is entitled to "certificates of necessity," and if additional facilities are required, may take advantage of the accelerated amortization features for the reduction of taxes.

Gottfrid Olson, foundry engineer, National Founders association, reviewed developments, methods and practices in the foundry industry, basing his remarks on a series of surveys conducted at numerous foundries at which production problems were encountered. Citing advances made by the industry, Mr. Olson compared wall thicknesses, complicated design and intricate core work of such castings as the air brake cylinder, aircraft cylinder, automobile V-block with the foundry product of 25 years back. He noted also more exacting specifications by the ordnance department covering shells of 6, 8, 10 and 12-inch diameter. A tensile strength of 50,000 pounds is now required compared with 28,000 pounds in 1910.

Discuss Apprentice Problems

Need of skilled mechanics and the importance of time in the training of apprentices in connection with the defense program was stressed by William F. Patterson, chief of apprenticeship, U. S. department of labor, Washington, who discussed problems of apprenticeship under existing conditions. The real job of apprentice training must be done by industry itself and in the plants with government lending every assistance to stimulate the program. The real peak in demand for trained skilled mechanics will be reached in 1942 and the immediate problem includes the upgrading of many present employes for supervisory roles as well as expansion in apprentice systems. Surveys have indicated the aircraft industry now has 100,000 skilled mechanics available and 500,000 may be required. The shipbuilding and construction industries will require fully 60 per cent of trained employes. Industry as a whole will require 25 per cent increase in skilled labor and many of the best in various trades are being drawn upward to supervising positions.

Mr. Patterson believes the apprentice-training set-up should be established with a long-range view as to future results, not merely as a bulge to cover the current emergency. He complimented industry for co-operating in the program, saying many industrialists had established training systems, while others were enlarging present programs. He urged against the element of compulsion entering into the program, saying industry amply had demonstrated its willingness and ability to carry the plan through. While he questioned the possibility of reducing the time for training, Mr. Patterson outlined a method by which the more advanced and adaptable young men could be given periodic examinations on various subjects and thus make it possible to reduce the time for the completion of some courses of training.

Take Long Range View

Merryle Stanley Rukeyser, economic commentator for the Hearst newspapers, advised a long view of the industrial picture based on possible permanent changes in the economic structure three or four years hence rather than the short range outlook now stimulated by the defense program. Emotional economics are too prevalent. The defense program has already revised industrial psychology as evidenced by the trend toward building up inventories. The hysteria as to possible shortages is not warranted, according to Mr. Rukeyser. The tax burden has not been reflected in prices or earnings as yet, but will be as defense orders materialize. Industry should resist inflation at all costs. If business goes the easiest way as to wages and costs, prices will get out of hand, he said, urging against cost increases wherever possible.

E. L. Berry, assistant general manager, Link-Belt Co., Chicago, presented an interesting discussion of "Practical Industrial Management." While there are many definitions of scientific management, Mr. Berry believes that it may be described as an attack on conditions that are susceptible of exact formulation. He pointed out that it is a function of management to plan procedures and to follow through to see that the procedures or standards are applied to the plant.

Such incentive systems will be only as good as the honesty and common understanding of the company and the men participating in it, according to Mr. Berry. The men must have the proper understanding of just what such incentive schedules in the plant are all about if such schedules are to work properly. Just as the worker must have tools to perform his tasks, management must have tools, and the most important in this instance is observation.

All officers of the association were re-elected. In addition to President Hamerstadt, these include: D. C. Bakewell, Blaw-Knox Co., Pittsburgh, vice president; J. M. Taylor, Chicago, secretary-treasurer; and A. E. McClintock, commissioner. District committees:

First district, the New England states: Chairman, G. R. Holmes, McLagon Foundry Co., New Haven, Conn.; vice chairman, H. B. Johnson Jr., General Fire Extinguisher Co., Providence, R. I.; R. F. Harrington, Hunt-Spiller Mfg. Corp. Boston; Franklin Farrel III, Farrel-Birmingham Co., Ansonia, Conn.; A. M. Cottrell, C. B. Cottrell & Sons Co., Westerly, R. I.

Second district, New York and that part of New Jersey north of a line drawn from Lambertville to Point Pleasant, and the Provinces of Ontario and Quebec in the Dominion of Canada: Chairman, Irving L. Jones, International Heater Co., Utica, N. Y.; vice chairman, P. R. Van Duyne, Meeker Foundry Co., Newark, N. J.; Hamilton Garnsey Jr., Goulds Pumps Inc., Seneca Falls, N. Y.; C. P. Clark, Clark Bros. Co., Olean, N. Y.; J. H. Hornung, Otis Elevator Co., Yonkers, N. Y.

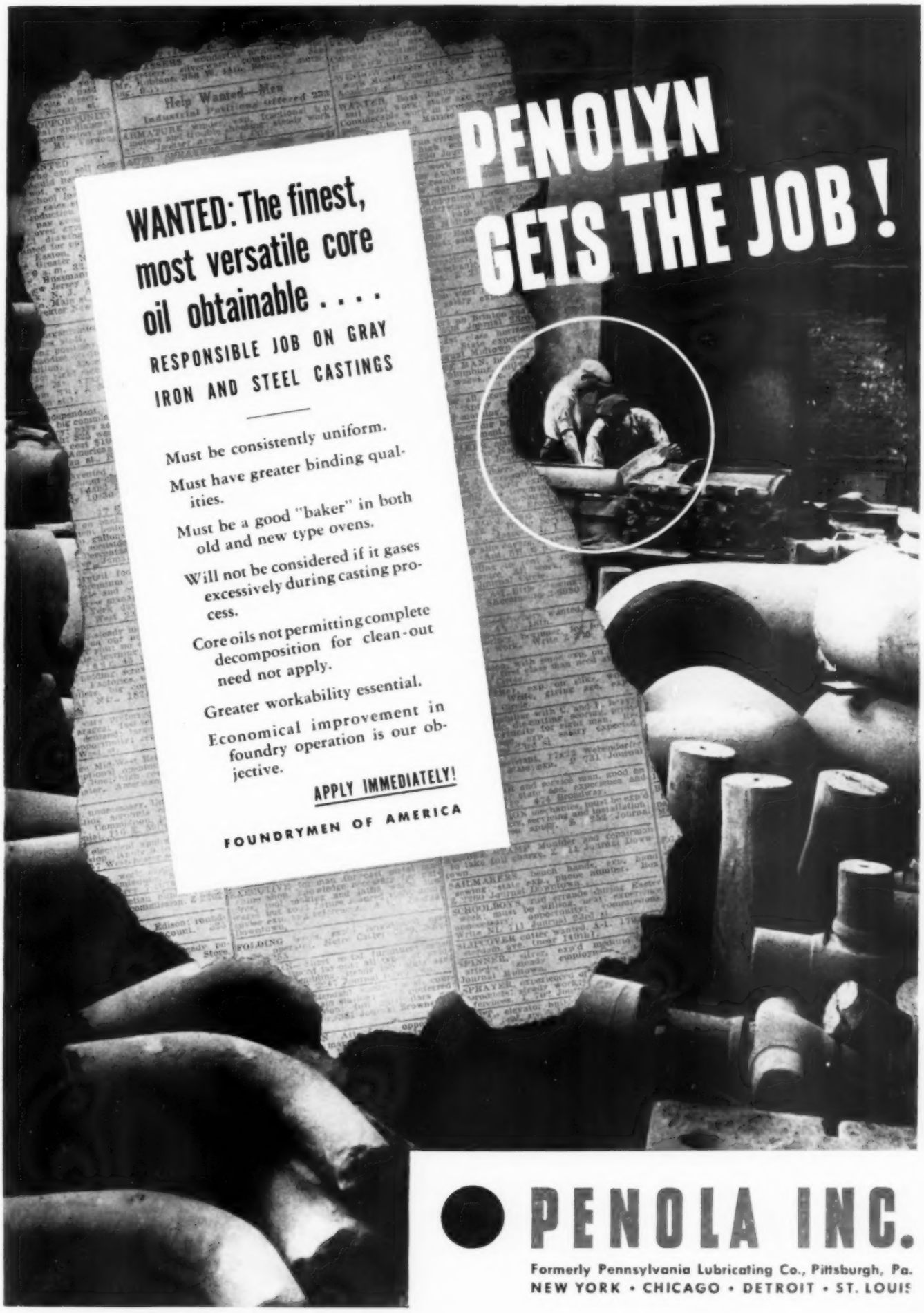
Third district, Pennsylvania, Delaware, Maryland, District of Columbia, and that part of New Jersey south of a line drawn from Lambertville to Point Pleasant and including these two towns: Chairman, James H. Anderson, Cooper-Bessemer Corp., Grove City, Pa.; vice chairman, G. L. Coppage, Pusey & Jones Corp., Wilmington, Del.; George R. Casey, Treadwell Engineering Co., Easton, Pa.; S. P. Hazard, R. D. Wood Co., Philadelphia; E. C. Moore, Erie City Iron Works, Erie, Pa.

Fourth district, the lower peninsula of Michigan, Ohio, Kentucky, Indiana and West Virginia: Chairman, M. W. Manz, Ohio Brass Co., Mansfield, O.; vice chairman, George Cannon, Campbell, Wyant & Cannon Foundry Co., Muskegon, Mich.; R. W. Gillispie, Jeffrey Mfg. Co., Columbus, O.; L. R. Wagner, Electric Steel Castings Co., Indianapolis; John M. Price, Ferro Machine & Foundry Co., Cleveland.

Fifth district, Illinois, Missouri, Oklahoma, Nebraska and Iowa: Chairman, A. H. Head, John Deere Tractor Co., Waterloo, Iowa; vice chairman, C. B. Magrath, Greenlee Foundry Co., Chicago; E. L. Berry, Link-Belt Co., Chicago; J. F. Culver, Century Electric Co., St. Louis; Ira G. Whitney, A. Y. McDonald Mfg. Co., Dubuque, Ia.

Sixth district, Wisconsin, Minnesota, upper peninsula of Michigan, North Dakota, South Dakota and the province of Manitoba in Canada: Chairman, C. F. Wehr, Wehr Steel Co., Milwaukee; vice chairman, William J. Grede, Spring City Foundry Co., Waukesha, Wis.; F. H. Clausen, Van Brunt Mfg. Co., Horicon, Wis.; H. O. Menk, Harnischfeger Corp., Milwaukee.

Seventh district, Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Arkansas, Louisiana, Texas and Tennessee: Chairman, G. E. Jones, U. S. Pipe & Foundry Co., Bessemer, Ala.; vice chairman, Foskett Brown, Gray & Dudley Co., Nashville, Tenn.; John D. Capron, Glamorgan Pipe & Foundry Co., Lynchburg, Va.; W. C. Trout, Lufkin Foundry & Machine Co., Lufkin, Tex.; Warren Whitney, James B. Clow & Sons, Birmingham, Ala.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DETROIT AMONG FOUNDRIES

By A. H. ALLEN
Detroit Editor, The Foundry

IRON and steel foundrymen in the Detroit territory are peering into the future and finding a lot of worry. They visualize the national defense program bulking up many times its present size and reaching out into nearly every industrial plant in this area, but with-al they see scant hope of much improved business for foundries from that source.

In the first place, the defense program locally is going to be pretty much centered around airplane subassemblies, airplane engines, machine guns, forged steel shells, army trucks and tanks. Airplanes take large numbers of cast and forged aluminum alloy parts, a fair number of alloy steel forgings, a lot of riveted aluminum alloy sheet, a good bit of steel tubing, and fabricated aluminum shapes, and rivets and screw machine parts. Engines are about one-half light alloy and one-half alloy steel, plus 1 or 2 per cent bronze.

Foundries Can Make Shells

On the question of shells, the larger mass production foundries are ideally suited to turning out cast shells by the millions if need be. But as yet the emergency has not reached the point where cast shells are given much recognition by ordnance experts. It is claimed in some quarters that fragmentation characteristics are not what they should be.

It is true that in the last war cast iron shells were made in large quantities and since that time a vast improvement has been made in quality control and physical characteristics of cast iron. Furthermore, there are a number of experimental projects now going forward to determine the advantages which better iron provides in shells, but apparently the ordnance department at the present time remains unconvinced. Further data from the work now under way may change the picture.

Machine guns, including various types of aircraft cannon, are built up largely of carefully machined alloy steel elements, though there may be some minor castings requirements. In the case of trucks, there are of course many applications for ferrous castings and foundries are bound to benefit to some extent from broadened truck production.

The outlook is clouded further by the possibility, though not yet probability, that 1942 automobile models either will be duplicates of 1941 designs or will carry only minor changes from present lines. Larger die foundries openly are expressing gloom about their 1942 programs. They appear convinced that auto builders are not going to have any important die changes. Even though duplicate dies of those now in use may be required, some manufacturers believe this type of business over the next year is going to suffer considerably.

Will Transfer Workers

Car builders have entered a cooperative program to supply parts and subassemblies for 24,000 two-engine and four-engine bombing planes for the army and for Great Britain. Already functioning is the industry's committee for air defense which, from its headquarters in the Graham plant in Detroit, is lining up parts suppliers throughout the country who may fit into an airplane parts program.

Naturally the auto industry is having to draw heavily upon its present personnel to staff all these extraordinary activities. This is a continuing process, steadily increasing. How it may affect production of automobiles is problematical. So far, no effect whatever has been felt, car production in October eclipsing all records for that month and production for November doing likewise. Seven or 8 months from now, when the embryonic defense projects in this area draw their first production breaths the story may be different.

For example, Packard expects to take 4000 of its current working force of 10,000 and transfer them to the Rolls-Royce aircraft engine manufacturing plant it is now erecting. Furthermore, about 15 per cent of the plant's floor space will be given over to certain phases of the Rolls-Royce program to supplement the three new buildings being constructed to house the main project as outlined at present.

Lest anyone get the idea that local foundries are contemplating going out of business, it should be pointed out that no industrial program with the gigantic stature of the defense activity can fail to result in some benefit to foundries, even if in the indirect form of plant equipment, conveyor systems, jigs and fixtures, etc.

There is a wealth of new plant activity in the Detroit territory. Packard is building three new structures for the Rolls-Royce program. Chrysler is building a new tank arsenal to be in production a year hence. Ford is rushing a vast new structure for building Pratt & Whitney aircraft engines, as well as a new magnesium foundry to supply engine parts. Murray Corp. of America and Briggs Mfg. Co. are equipping new aircraft fuselage and new wing divisions. Not yet official is a $21,000,000 aircraft assembly plant to be built in this district by the government and operated privately. Buick is expected to receive an order shortly for Pratt & Whitney engines, to be built in its Flint, Mich., plants.

Order Cleaning Equipment

Foundry equipment interests in Detroit report a rush of business, especially those supplying such items as cleaning equipment and similar devices for treatment of finished castings. Deliveries are extended on many of these machines, some orders already entered not being scheduled for shipment until the end of March.

Antioch process for production of aluminum castings in plaster of paris molds, developed at Antioch college, Yellow Springs, O., has been purchased by General Motors Corp., and is being installed at a plant in Anderson, Ind., ostensibly for production of aluminum alloy airplane castings. The process permits production of aluminum castings with superior finish and to exceptionally close tolerances. Little information is available here as to just what parts General Motors will cast. The suggestion is heard that there may be similar installations in other General Motors plants.

Reader's Comment

Readers are invited to comment upon articles and other editorial material appearing in THE FOUNDRY. *The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief.*

THE EDITORS

Sash Weight Molds

TO THE EDITORS:

We have read with interest the "Question and Answer" in your October issue on water cooled sash weight molding jackets and heartily agree with your answer.

Many, many years ago, when Levering Bros. operated this plant, they attempted this same style of molding without success. When the molds were first used, after some slight alterations, the idea worked very well. However, after a short time of operation, they became unusable and were discarded for the present system of end drawn patterns. Only last May, while housecleaning, did we stumble over the old jackets. Our best advice to the party who sent in the question is to scrap them, and the sooner done, the more money they will save.

The Savannah Foundry & Machine Co. of Savannah, Ga. have been using the water jacket system for the past year or so and, perhaps, if your party is still interested in more information, you might refer them to this firm, whom, we understand, have ironed out all of the troubles of that system.

EDWARD J. AMENT, VICE PRESIDENT
National Sash Weight Corp.
Baltimore

Plant Protection

TO THE EDITORS:

In the war-torn world of today America must strengthen her internal and external fortifications if she is to survive the menace of totalitarianism. The protection of our industrial facilities to insure the uninterrupted production of goods and material is essential to our national defense. Based upon this premise the FBI in September of 1939, in accordance with the request of the war and navy departments, inaugurated a program to survey the protective facilities of manufacturing establishments having large contracts to provide the government with defense materials. The purpose of the surveys is to submit recommendations to bolster the physical protective facilities of the manufacturing plants for the prevention of sabotage and espionage activities.

The first and final responsibility to give speed and strength to our national defense program by protection against espionage and sabotage lies with industry itself. Only through the energy and alertness of its officials and workers will the full measure of preparedness be attained.

In line with this plant survey program and to assist industrial concerns and municipalities in establishing effective protection against possibilities of acts of espionage and sabotage the FBI prepared a comprehensive booklet entitled "Suggestions for Protection of Industrial Facilities." Because of its confidential nature this booklet is limited in distribution to heads of duly constituted law enforcement agencies and executive officials of industrial concerns manufacturing defense materials under government contracts.

In response to the many questions as to how to obtain this publication I wish to state that a copy will be furnished an industrial concern upon the written request of an executive official.

J. EDGAR HOOVER
Director
Federal Bureau of Investigation
Department of Justice
Washington

Safety Programs for Foundries Studied

Installation of a safety program is a selling job in which workman must be convinced their personal safety means as much to them as to the company, Peter E. Rentschler, president, Hamilton Foundry and Machine Co., Hamilton, O., declared in an address at the 29th National Safety Congress and Exposition in Chicago, Oct. 7 to 11. His topic was "How To Build A Safety Program For the Small Foundry."

"It is a very difficult selling job to educate the workman so that he will realize that the expenditures on the company's part must be augmented by his continuous voluntary assistance," said Mr. Rentschler. "In the last analysis, safety consciousness revolves around the human factor and the individual workman."

The speaker outlined an "intensive" safety program which has been conducted in his establishment since 1938. Employes participate in this program through a workmen's committee which holds regular meetings for discussions of safety measures in the foundry and to offer recommendations to the management. The program also includes efforts to interest employes' families in safety and hygiene conditions at the plant. These plant safety moves are co-ordinated with those of the National Safety council and local safety programs with great success, he stated.

"We feel that we have had a very co-operative spirit toward our program on the part of our employes," said Mr. Rentschler. "We have not run the program on the basis of philanthropy or paternalism but on the sound business basis of more earnings to the employe as well as less loss to the company. Employes appreciate a management's consideration when they are convinced that safety and hygiene in the plant mean more money in their pockets."

Showing of motion pictures, discussion and distribution of safety facts among the employes aided the management's selling job while health consciousness was also instilled by similar means among workers to the mutual advantage of the worker and the company.

L. C. Wilson, general manager, Reading Steel Casting division, American Chain & Cable Co., Reading, Pa., another speaker at the conference on foundry problems, discussed the topic "Maintaining Safety Interest in the Small Plant." Among points on which he touched were ways and means of approaching and maintaining the safety interest of the supervisory force and foundrymen; the value of executive contact; the value of contests, posters, stunts and similar features; what it means not to maintain interest and how it might affect production and costs.

Lamar S. Peregoy, president, Sivyer Steel Casting Co., Milwaukee, Wis., presided at the foundry conference. He was introduced by John H. Holzbog, personnel director, Chain Belt Co., Milwaukee, and chairman of the foundry committee of the National Safety council.

The immense safety exposition held in connection with the gathering of safety experts offered a liberal education in the latest development of safety devices for industry. Some 125 exhibitors participated. Protective clothing was strongly featured in exhibits showing everything from steel helmets to steel shoes, asbestos overalls, gloves, goggles, etc. Materials handling equipment was represented by showings of cranes, hoists, trucks and other devices, while the sanitation phases of industrial safety were covered by exhibitors of nonslip floor cleaning preparations, soaps for dermatitis control, toilet drips and atomizers and other devices.

Since silicosis was added to the list of compensable occupational diseases in Ohio, 511 claims for compensation have been filed with the Industrial commission. Of that number 164 have been allowed, 253 disallowed and 94 still are pending. Eighty-six of the claims allowed originated in foundries, 64 in ceramics work, 9 from stone cutters, and 5 from miscellaneous work.

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Chesapeake

APPROXIMATELY 90 foundrymen from Baltimore, Washington, and the surrounding territory met at the Lord Baltimore hotel, Baltimore, on Nov. 15 and organized the Chesapeake Chapter of the American Foundrymen's association. Robert E. Kennedy, secretary of the A. F. A. called the meeting to order and explained the purpose of the gathering. He then announced the report of the nominating committee which had been appointed at the preliminary organization meeting on Oct. 14. The following officers and directors were elected: Chairman, E. W. Horlebein, president, Gibson & Kirk Co., Baltimore; vice chairman, J. E. Crown, master molder, United States Navy yard, Washington; secretary-treasurer, L. H. Denton, convention director, Baltimore Association of Commerce; directors for 1 year, H. S. Malsberger, foundry superintendent, American Chain & Cable Co., York, Pa., H. A. Horner, metallurgist, The Frick Co., Waynesboro, Pa., J. C. Pendleton, foundry superintendent, Newport News Shipbuilding & Dry Dock Co., Newport News, Va.; directors for 2 years, C. H. Frear, United States Navy, bureau of ships, Washington, C. C. Adams, general foundry superintendent, Bethlehem Steel Co., Sparrows Point, Md., S. W. Brinson, master molder, United States Navy yard, Portsmouth, Va.; directors for 3 years, William C. Franz, assistant secretary, Flynn & Emerich Co., Baltimore, Max Kuniansky, general manager, Lynchburg Foundry Co., Lynchburg, Va., and Victor F. Stine, vice president, Pangborn Corp., Hagerstown, Md. The following were the nominating committee: F. B. Gately, Flynn & Emerich Co., Baltimore; John D. Wise, Pangborn Corp., Hagerstown, Md.; H. F. Taylor, United States Naval Research laboratory, Washington; and R. T. Covington, American Hammered Piston Ring division, Koppers Co., Baltimore.

At the close of the business session, Secretary Kennedy called upon I. R. Wagner, Electric Steel Castings Co., Indianapolis and chairman of the Central Indiana Chapter of the A. F. A. who presented the cast iron rattle to the baby chapter.

Chairman Horlebein then introduced Don. J. Reese, development and research engineer, International Nickel Co., New York, who presented an interesting and instructive discussion on, "Cupola Operation." Mr. Reese dealt with the operation of the cupola in its many phases, highlighting the relationship between cupola diameter, weights and sizes of materials entering the charge. Black and white as well as color slides were used to illustrate the talk.—*F. G. Steinebach.*

S. California

IN ADDITION to a discussion of alloy steels by John Spillane, Electro Metallurgical Corp., it was "Stump the Experts" night at the Oct. 24 meeting of the Southern California Chapter of the A. F. A. held at the Hayward hotel, Los Angeles.

Officials on the evening's program included James E. Eppley, president, Kinney Iron Works, Vernon, Calif., and chairman of the chapter, who served as moderator; and J. G. Coffman, Los Angeles Steel Castings Co. Ltd., Los Angeles, who was timekeeper. Experts included: John Spillane, Electro Metallurgical Sales Corp., steel; Roy E. Paine, Aluminum Co. of America, nonferrous; Earl D. Shomaker, Kay-Brunner Steel Products, patterns; Walter F. Haggman, Foundry Specialties Co., historical; Edgar C. Hummel, Utility Electric Steel Foundry, steel melting. The experts were given 30 seconds to consider each question and 60 seconds to answer it. Anyone asking a question that stumped the experts was given a Havana cigar. Many questions were asked and answered, and the experts were seldom stumped, though the membership sometimes differed in methods. A motion picture, "The Eyes Have It," an eye protection picture was shown and created much comment and interest. In addition, George Groman entertained the group with his talk, "Dialects of America."

Annual Christmas party of the chapter will be held at the Lakewood Country club, Friday, Dec. 13, according to the present plans of the entertainment committee. Dick Hughes is chairman in charge of arrangements.—*W. F. Haggman, secretary.*

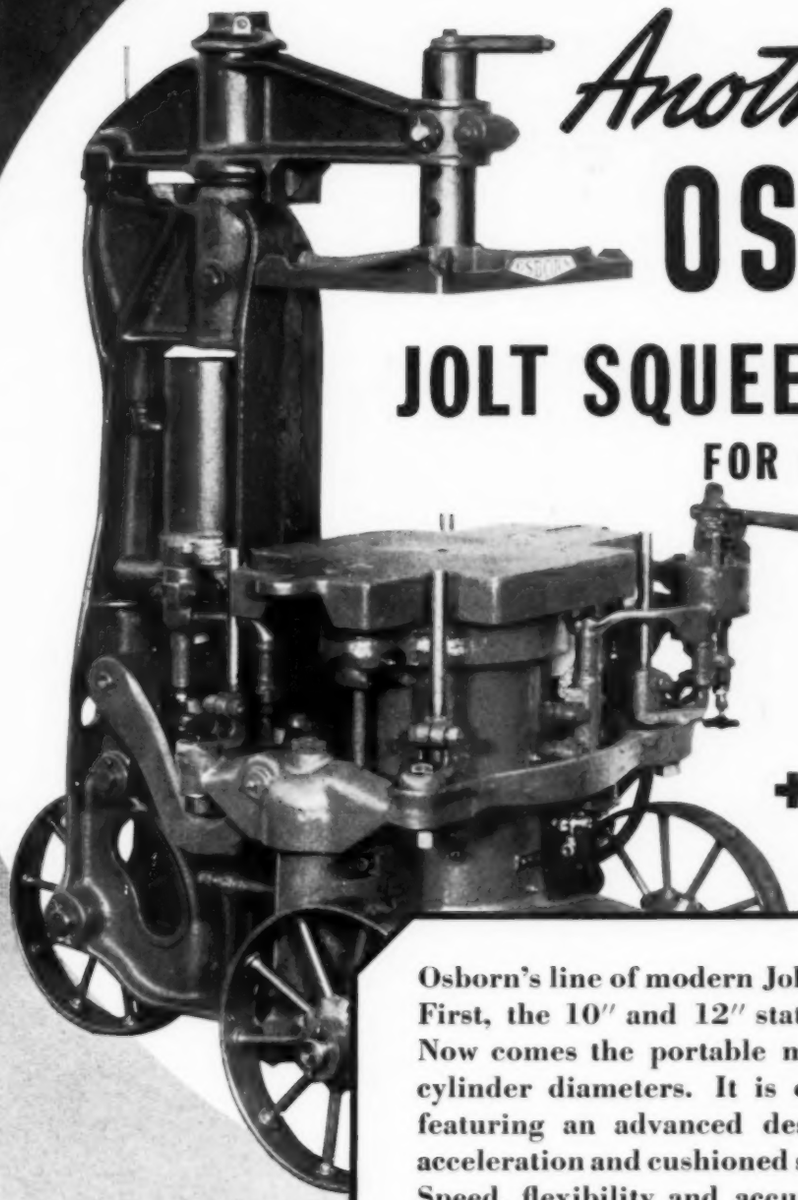
Chicago

CASTINGS will play a significant part in the production of ordnance equipment, according to Col. Donald Armstrong, executive officer, Chicago area, United States army ordnance department, who addressed the Chicago chapter, of the A. F. A. at the first meeting of the 1940-41 season at the Chicago Towers club, Oct. 14. Despite inclement weather, more than 100 attended the meeting to hear a review of the ordnance situation in connection with the nation's national defense program.

Chapter Chairman Garnet P. Phillips, International Harvester Co., presided. Immediately after the dinner, some high-quality quartet singing was contributed by the Logan Four, a Chicago group interested in music and members of the Society for the Preservation and Encouragement of Barber Shop Quartet Singing in America.

Col. Armstrong asserted that the ordnance problem is the most difficult of all problems of supply and that the country is now reaping the harvest of its dislike for industry to manufacture munitions during peace-time. In an emergency like the present one, government arsenals have capacity to produce only 10 per cent of the ordnance needs, making it imperative that private

(*Continued on page 75*)



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Machine Number	*710J*	*712J*
Table Size	16″ x 25″	17″ x 27″
Squeeze Cylinder Draw	10″	12″
Lifting Pins adjustable front to rear	10″ to 19″	11″ to 20″
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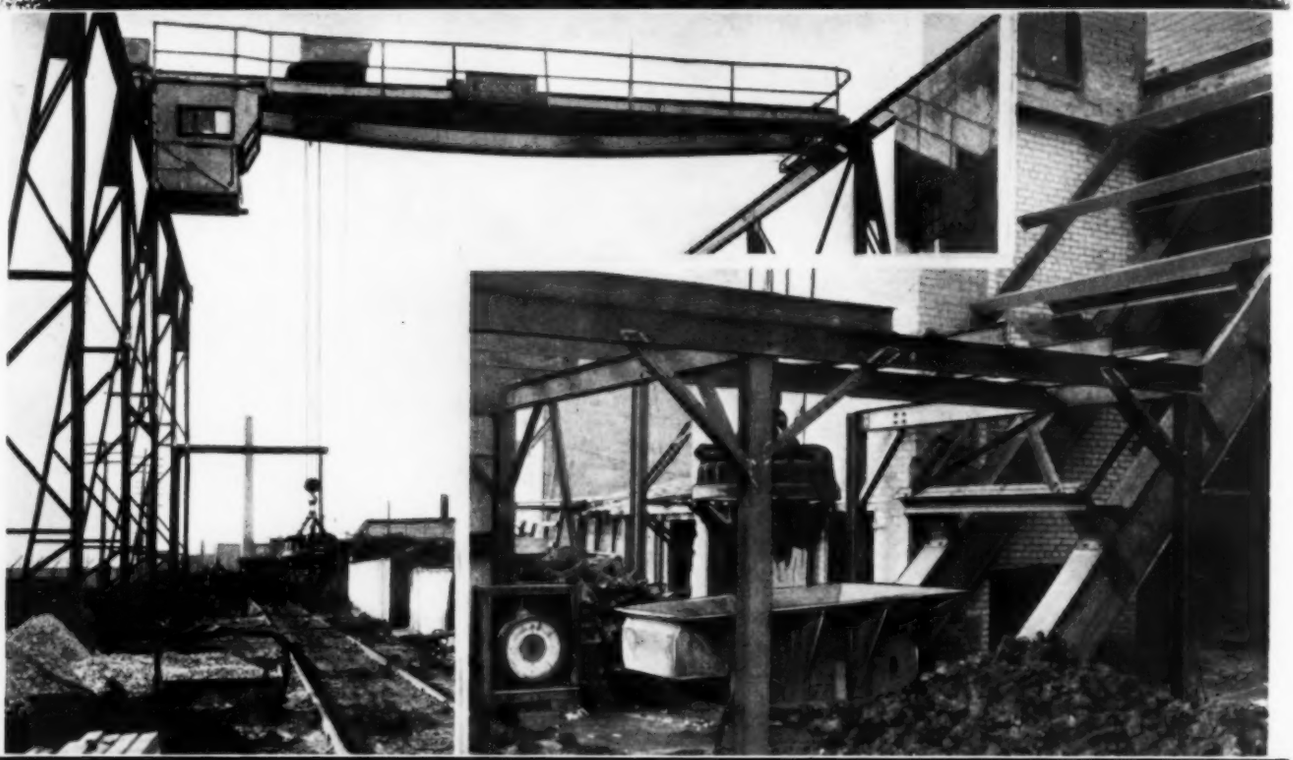

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(*Continued from page 72*)
industry take over 90 per cent of the total.

Responsibility for industrial mobilization and procurement rests with the assistant secretary of war, whose office was established under the national defense act of 1920. Col. Armstrong asserted that because of the planning and organization program which has been going on during the intervening period, and particularly in the past decade, nine months' time has been saved in getting into ordnance production in the present crisis.

Stressing how foundries will fit into the picture, the colonel stated that all caliber of guns up to and including 155 millimeter can be manufactured by centrifugal casting. This has been proved by conclusive experiments made at Watertown arsenal, Watertown, Mass. Considerable quantities of steel castings also will be utilized in the construction of tanks, he said. A medium-sized tank weighing 25 tons will require 6 tons of castings; older model tanks weighing 21 tons used only 3 tons of castings. The steel castings industry also will be called upon to supply quantities of armor plate, Col. Armstrong declared, since the nation's capacity for rolled steel armor plate is far inadequate to meet demands.

Worst gale in this area since the turn of the century did not prevent 150 members of the Chicago chapter of the American Foundrymen's association from attending the organization's second meeting of the season at Chicago Towers club, Nov. 11. A roundtable discussion on gating and risering of castings was the topic which inspired this excellent attendance considering the unfavorable weather conditions.

The informal technical program was arranged and directed by Chapter Chairman Garnet P. Phillips, International Harvester Co., Chicago, and Vice Chairman and Program Committee Chairman L. L. Henkel, Interlake Iron Corp., Chicago.

So that open discussion might proceed along specific rather than general lines, three group meetings were held simultaneously—one devoted to gray iron and malleable, a second to steel, and the third to nonferrous castings. The gray iron and malleable group was directed by Elmer J. Carmody, foundry engineer, Charles C. Kawin Co., Chicago; the steel group by Henning A. Forsberg, general superintendent, Hubbard division, Continental Roll & Steel Foundry Co., East Chicago, Ind.; and nonferrous by Arthur K. Higgins, nonferrous metallurgist, Allis-Chalmers Mfg. Co., Milwaukee. Each group discussed the various accepted types of gating and risering for different types of castings, as well as the difficulties which attend their use. Consensus was that any method is acceptable if sound castings are produced.

A preliminary to the group meetings was the showing of a sound film "Scenic Wonders and Mineral Resources of Arizona" prepared and made available by the bureau of mines, Washington.—*Erle F. Ross.*

Central Indiana

REGULAR monthly meeting of the Central Indiana chapter was held Nov. 4 at the Washington hotel, Indianapolis. Principal speaker of the evening was E. C. Zirzow, National Malleable & Steel Castings Co., Cleveland, who discussed "Sand Control in a Malleable Foundry." He pointed out that in control of molding sand factors to be kept in mind include preparing the sand so that it can be worked easily by the molders to reduce molding losses to a minimum; sand must produce sharp accurate contours on castings; it must give sound castings free from blow holes, scabs, crust, etc.; casting surfaces produced must be smooth, sand must clean easily from castings to keep cleaning costs low, and cost of preparation must not be excessive.

Mr. Zirzow then described various phases of sand control as practiced in his plant for both molding and for core making. A chief sand man makes all changes in molding and core sand mixtures, and sets up various moisture, bond and permeability limits; determines any changes to be made in raw materials; runs all experimental work, and checks all casting defects caused by sand. Routine tests for moisture, permeability and bond are run on all system sands every half hour, and a simple sieve test made every other day. A true sieve test is run once a month. Facing sands are tested periodically throughout the day.

Core sand mixtures are tested twice each day for moisture, green permeability, green bond and dry bond. Dry permeabilities are determined periodically. Following Mr.

Wisconsin Chapter holds interesting meeting and these are some of the discussion leaders. Fig. 1—L. H. Hahn, Sivyer Steel Casting Co., Milwaukee. Fig. 2—Ed Roth, Motor Castings Co., Milwaukee. Fig. 3—William George, R. Lavin & Co., Chicago. Fig. 4 (Left to right)—D. I. Dobson, General Malleable Corp., Waukesha, Wis., and Martin Harder, Lakeside Malleable Castings Co., Racine, Wis.

Zirzow's talk, an interesting discussion period was held.

Next meeting of the chapter will be held at the Washington hotel on Dec. 2. A. B. Kinzel, chief research metallurgist, Union Carbon & Carbide Laboratories, New York, will speak on the subject "Foundry Metallurgy Brought Down to Earth."

Ontario

MEETING of the Ontario chapter on Oct. 25 at Rock Garden lodge, Hamilton, drew an even greater attendance than the opening meeting of the season with 114 at the dinner. Chairman D. M. Storie, Fittings Ltd., Oshawa, was in charge of proceedings. Special feature of the meeting was a draw for a combination sandwich toaster and waffle iron, donated by H. S. Simpson, National Engineering Co., Chicago, and vice president, A. F. A., the proceeds going to the Canadian Red Cross society. L. P. Robinson, Werner G. Smith Co., Cleveland, and director, A. F. A. rendered real assistance in bringing the proceeds to $57.

The meeting passed unanimously a resolution expressing regret at the passing of John A. Penton, and voicing appreciation of the work which he had done for the foundry industry. In making the motion, which was seconded by A. G. Storie, Fittings Ltd., Oshawa, Ont., L. L. Anthes, Anthes-Imperial Ltd., Toronto, Ont. made reference to the birth of the late Mr. Penton at Paris, Ont., his association with the Playfair works at Midland, Ont. and his life long admiration of Great Britain.

The speaker of the evening was Herbert H. Fairfield, metallurgical laboratories, bureau of mines, Ottawa, who presented an interesting discussion on, "Application of Science to Foundry Work, or Laboratory Controlled Castings."

There has never been complete agreement on the causes of scrap castings and with the present demands for highly mechanized armed forces it is imperative that the foundry industry should give this problem careful consideration in approaching the goal of efficient mass production. Reduction of scrap to a minimum involves the attainment and maintenance of ideal manufacturing conditions, a state only reached through observing every detail and co-ordinating all the factors involved.

From data compiled from the findings of experts the causes of scrap have been attributed to various factors in about the following portions: Metal, 8; molding, 8; molding sand, 6; cores, 4; pouring, 2; gating, 2; design, 2; melting, 1; flasks, 1; pattern equipment, 1; and mold assembly, 1.

By keeping records of a great number of tests it is possible to arrive at carbon-silicon and manganese-sulphur ratios which will give the greatest freedom from defects for the manufacture of a given casting under certain conditions. Generalizations in respect to these ratios are of little value and they must be worked out for the individual case if the best results are expected to be obtained.

By an examination of the dendrite pattern at a magnification of 50 diameters, it may be possible to tell more about the iron than by a study of the microstructure at magnifications of 500 or 1000 diameters.

Distribution of ferrite is another factor of highest importance in super-machinable iron, and it may be controlled by the addition of alloying elements. Grain size also plays an important part in machinability.

Investigations have indicated an important connection between the hardness of cores and the occurrence of scrap castings. Reference was also made to the importance of molding sand, methods of gating and rates of pouring in production of minimum number of scrap castings.—*G. L. White, secretary-treasurer.*

Quad-City

OCTOBER meeting of the Quad-City chapter of the A. F. A. was held at the Fort Armstrong hotel, Rock Island, Ill., Oct. 21. There were approximately 65 members present for dinner. Nathan Lesser, Deere & Co., Moline, Ill., and chairman of the chapter presided. Announcement was made by A. H. Putnam that the chapter would have a Christmas party for the December meeting.

Mr. Putnam also introduced the principal speaker, C. M. Dale, manager, Liberty Foundries Co., Rockford, Ill. who discussed, "Casting of Piston Rings." Mr. Dale gave an interesting and descriptive picture of the manufacture of various size piston rings for all purposes. He stated that the field was highly specialized calling for specialized equipment. Melting and analysis of iron used were discussed as well as sand used, furnace and pattern equipment. Mr. Dale discussed treatment necessary to make longer lasting rings under subnormal operating conditions. Inspection of pattern equipment and rings is an important feature which is given a great deal of attention because of the close tolerances under which the manufacturer has to work. Many questions were asked by the group and real interest in all phases of the talk was shown by all members attending the meeting.

Dr. C. H. Lorig, Battelle Memorial institute, Columbus, O., was the principal speaker at the Sept. 16 meeting of the Quad-City chapter, held at the Blackhawk hotel, Davenport, Iowa. Approximately 75 members and guests attended to hear the discussion on "Research and Developments in Cast Metals."—*J. Morgan Johnson, secretary treasurer.*

Central New York

A DISCUSSION on sand featured the regular meeting of the Central New York Chapter of the A.F.A., held Oct. 11 at the Onondaga hotel, Syracuse, N. Y. Frank Wheeler, Kimman & Wheeler, Syracuse, and chairman, presided. Immediately following the dinner, Chairman Wheeler introduced Harry W. Dietert, Harry W. Dietert Co., Detroit, who discussed, "The Sand in Your Foundry." Mr. Dietert is scheduled to give four lectures on this subject before the chapter. He presented the first lecture of the series, the others to follow at the next three consecutive meetings. The lectures are creating interest among the Central New York foundrymen and the turn-out for the first fall meeting was gratifying to the chapter officers.

Mr. Dietert presented to each foundryman present a booklet entitled, "The Sand in Your Foundry," which is a condensed outline of the information available on foundry molding sands. He followed that outline in his first lecture, explaining under each heading or section the applicability of the information presented. One of the interesting points brought out was the mating of molding sand and core sand. He explained that core sand should be one sieve coarser than molding sand and that, by doing so, a foundryman will get a higher permeability and a better finish on his casting. The speaker also stated that high compression sands are suitable for work where cores are used and that the low compression sands should be used for production of plate castings.

Effect of clay content of sand on the sintering point was explained by comparing the sintering point of sand grains without any clay matter and after sintering is added. A 6 per cent addition of sea coal by volume will increase the sintering point of molding sand 100 degrees. This is one of the beneficial effects of sea coal additions to foundry heaps. Effect various methods of mixing sand have on the dry compression strength also was illus-

(*Continued on page* 78)

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N-50

(*Continued from page 76*)
trated. An interesting discussion period followed the conclusion of Mr. Dietert's address.—*L. D. Wright, secretary.*

Detroit

CHARACTERISTICS and uses of core binders and washes were outlined by J. A. Gitzen, president, Delta Oil Products Co., Milwaukee, at a meeting of the Detroit chapter, held at Detroit-Leland hotel on Nov. 14, a week earlier than usual. About 75 members and guests were on hand to hear Mr. Gitzen present an interesting and impartial analysis of various types of organic and inorganic binders, core oils and washes. He emphasized the point that study of these materials must be carried out by expert organic chemists, that the average foundry metallurgist is not too familiar with organic chemistry and hence must rely on the findings of trained chemists who are experienced in that particular field.

In the class of organic binders, the speaker discussed cereal binders, petroleum pitch, coal tar pitch, hardwood pitch and resins. In the inorganic field, he pointed out that clay and cement, while they do liberate less gas than the organic materials, are not easily made waterproof, and if used in too great amounts tend to cut down permeability of the sand. Mr. Gitzen examined in detail the use of various types of binders in production of collapsible cores for steel, malleable and nonferrous castings. He mentioned that a solution of resin instead of powder resin had a much more uniform effect in steel and malleable cores. The speaker debated the merits of linseed oil versus other types of core oils, and cited improvements which have been made in fish oils, and soya bean oil. He pointed out that addition of petroleum polymers to soya oil speeded up the drying time. Reviewing the properties of powder and plastic core washes, he presented some general observations based on 8 years of research on these materials.—*A. H. Allen, secretary.*

Pittsburgh

DIFFICULTIES involved in production of good castings using a scrap metal running as high as 100 per cent in some cases held the spotlight in a talk presented by Max Kuniansky, general manager, Lynchburg Foundry Co., Lynchburg, Va., before the regular meeting Pittsburgh Foundrymen's association.

The meeting was the first technical session of the year, held Oct. 21 at Fort Pitt hotel. R. C. Heaslett, Continental Roll & Steel Foundry Co. and new president of the association, was chairman.

Mr. Kuniansky's talk was a straightforward exposition of the work done by his company, some of the difficulties involved and the means used to solve them. A complete breakdown of costs was shown, and the speaker outlined the results of using the Badeau wage-incentive plan over a number of years.

Work along three general lines was discussed. The company produces small chilled castings such as plowshares on a production basis, has a line of cast pipe in large sizes, centrifugally cast against permanent metal water cooled molds, and in addition does a considerable amount of custom work on items such as large pots and kettles used in the chemical and other fields.

Production of castings without the use of risers was fully described and evoked considerable interest. Methods of cleansing metal while using a high scrap content charge also came in for considerable discussion. Because of economic disadvantages, it is difficult to use much pig iron at the company's plants. Methods whereby scrap is made to serve in place of iron were outlined by the speaker. Considerable discussion came out following the talk, led by J. H. Johnston, Westinghouse Electric & Mfg. Co., and last year's president of the association.

Pittsburgh association will hold its annual Christmas party Dec. 16 at William Penn hotel. W. S. Scott, Pittsburgh Coke & Iron Co., Grant building, Pittsburgh, is chairman of the entertainment committee. C. H. Paul, Mackintosh-Hemphill Co., 301 Bingham street, S. S., Pittsburgh, is secretary. Reservations can be sent to either.—*R. L. Hartford, chairman publicity committee.*

New England

THE regular meeting of the New England Foundrymen's association was held at the Engineers club, Boston, Nov. 13. After dinner, Francis LeBaron, president of the association, introduced Prof. John T. Norton, associate professor of metallurgy, Massachusetts Institute of Technology, who spoke on "Inspection of Castings with X-Ray and Radium."

Professor Norton's talk was illustrated with many interesting slides. He discussed the value of the X-ray and radium as a means of determining the quality of a casting. The three principal parts of the examination of a casting for defects by means of the X-ray and radium are: Technique; interpretation of the photograph; what the defect means in terms of foundry manufacture.

The speaker said radium was perhaps a cheaper method of examining a casting but it was dangerous material to handle. He explained the magnaflux method of examining castings for defects and related in detail the advantages of this method as compared to the radium method. He added that the magnaflux method cannot be employed for nonferrous castings.

After the speaker had concluded, many of those present took part in the discussion which followed.

The next meeting of the association will be held in Boston at the Engineers club on Dec. 11 with a talk on "Capital 0687" by Manfred Bowditch, director, division of occupation hygiene, department of labor and industry, Commonwealth of Massachusetts—*M. A. Hosmer.*

Philadelphia

REGULAR meeting of the Philadelphia Chapter of the A.F.A. was held at the Engineers club, Nov. 8. Ninety attended the dinner, which was followed by an interesting colored film, "A Vacation in Mexico," photographed by Clarence Ederer, Ederer Inc., Philadelphia.

W. W. Rose, executive vice president, Gray Iron Founders' Society Inc., speaker of the evening, was introduced by Walter Yost, former president of the Philadelphia Foundrymen's association. Mr. Rose spoke on, "Inconsistent Sales Practices of Gray Iron Foundries." He stated that disposal of products can be divided into several categories including merchandising, specialty selling, industrial selling, and order taking, and the latter seemed by far the most prevalent in the foundry. However, industrial selling is the real problem of the foundry, and to do that properly the salesman should be thoroughly conversant with costs of manufacture, desirability of the business, production phases, accurate knowledge of the products made by the foundry as to application, advantages, limitation, etc.

Mr. Rose pointed out that while those qualifications seemed a rather large order, they were possible of attainment. It means training men for that work by the individual foundry, and one foundry has established and is carrying through a training program for that very purpose. Other phases relating to selling which were discussed included cost accounting and its necessity, education of castings consumers to the value of gray iron, collective

(*Continued on page 80*)

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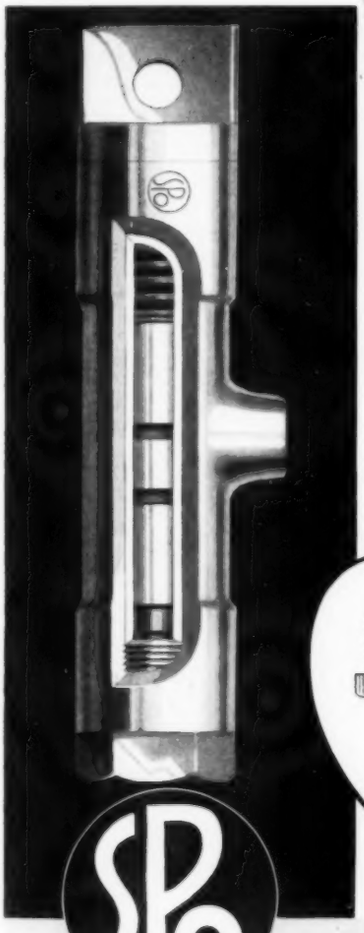

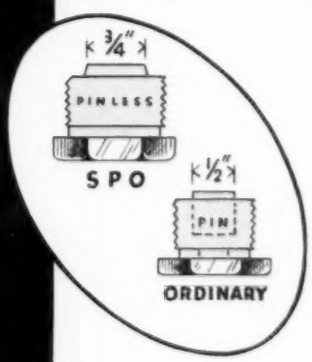

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SPO Vibrators are *guaranteed to give you 100% satisfaction.* They have been designed, not to use up old equipment we had on hand, but *entirely in the new,* out of our own experience as foundrymen.

The SPO Vibrator has a body (corresponding to the cylinder in your motor) of heat-treated high carbon forged steel, which has a bushing or liner of special bronze broached and burnished. The plunger (corresponding to a motor piston), of special alloy, is likewise ground to a mirror-like finish. These two delicately finished surfaces make possible exceedingly close tolerances, with well-nigh perfect fitting and operation. The SPO one-piece *pinless* anvil averages 2¼ as much striking area as on ordinary vibrators (see diagram). You have a carefully balanced unit that hits equally hard on both ends.

So—don't "patch" your old vibrators any more. That doesn't pay. Instead, try SPO's. It *does pay.*

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SPO also designs and builds both molding machines and pattern equipment, and guarantees them unconditionally to produce castings which will be in full accordance with your specifications.

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Manufacturers and Specialists in Molding Machines, Vibrators, and Patterns for Production

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(*Continued from page* 78)

sales promotion, and the work that the Gray Iron Founders' society is doing for the industry.

On Dec. 20 the chapter plans a Christmas party to be held at Hi Top Country club, Drexel Hill, Pa., and there will be no technical meeting in December.—*J. T. Fegley, chairman, publicity committee.*

N.E. Ohio

OVER 250 members and guests attended the November meeting of the Northeastern Ohio chapter of the A. F. A. held at the Cleveland club, Cleveland, on Nov. 14 with President Ray Fleig presiding. W. L. Listerman, Cleveland District special agent, Federal bureau of investigation gave an interesting coffee talk on the work of the bureau and its functioning. Principal speaker of the evening was H. W. Dietert, president, Harry W. Dietert Co., Detroit, who discussed molding and core sand problems, and demonstrated equipment for determining various characteristics of those sands.

One of the most interesting features of Mr. Dietert's exposition was the visual demonstration of the reaction of various sand mixtures to high temperature conditions. That was accomplished by using a specially designed high temperature oven fitted with a projection lens which depicted on a screen what was transpiring within the oven. Examples of sands were shown which caused rat tails, buckles, scabs, etc., and by making certain changes, those defects were eliminated.

In his discussion Mr. Dietert pointed out that control of sand is necessary to reduce the amount of scrap castings to a minimum, and that after some experimental work, definite standards may be set up for the various factors such as grain size, clay content, green strength, dry strength, etc. for the individual foundry jobs. After establishment of the standards, routine tests will enable the foundryman to keep the sands within the desired limits. Announcement was made that the annual Christmas stag party of the Northeastern Ohio Chapter will be held at the Hotel Carter, Cleveland on Thursday, Dec. 12.—*Edwin Bremer, publicity chairman.*

Metropolitan

FIRST regular meeting of the Metropolitan Chapter of the A.F.A. was held at the Essex house, Newark, N. J., on Wednesday, Oct. 9. The occasion was of particular significance in that the following national A.F.A. officers were present: C. E. Hoyt, executive vice president, Marshall Post, past president, W. B. Coleman, director, and L. P. Robinson, director.

Dr. N. E. Woldman announced an educational course of eight lectures divided into two terms, one to be given this fall and the other during the winter. It is planned that this course shall be presented to appeal to the designing engineer and consumer of castings. Sam Tour announced that the safety and hygiene committee are working with the authorities in New York State and New Jersey for reasonable and effective safety and hygiene laws.

The principle event of the evening was an excellent talk on "How Molding Sand Affects Casting Finish" by W. C. Reichert, metallurgist, American Brake Shoe & Foundry Co., Mahwah, N. J. So much of what Mr. Reichert said was of great importance that no review of his talk can possibly do it justice. The many phases of sand problems were all carefully presented to show their effect on the casting surface quality, which Mr. Reichert said was of major importance to foundrymen because the proper surface finish will reduce cleaning costs, and have much better sales value.

Factors which affect finish and which were discussed and illustrated by the speaker were sand grain fineness, water content, sea coal, metal temperature, clay content, mold hardness, sand uniformity, and facing materials. Mr. Reichert said in his concluding statement that the desirable finish of castings can be achieved by co-ordinating the factors involving the sand, facings, gating, and metal temperature.

Active discussion on practical casting finish problems followed. The discussion was directed by the Technical Chairman C. B. Somers, Whitehead Brothers Co., New York. —*Fred G. Sefing.*

Recent developments in foundry core baking and mold drying practices and careful core room layout have been responsible for saving thousands of dollars in the foundry industry, declared C. A. Barnett, Foundry Equipment Co., Cleveland, in addressing the Metropolitan Chapter of the AFA on "Cores and Costs" at a meeting held Nov. 6, at the Essex house, Newark, N. J. A group of 85 members and guests was in attendance.

Introduced by technical chairman H. G. Lamker, Wright Aeronautical Corp., Paterson, N. J., Mr. Barnett listed the following as the four most important factors in core baking: Oven temperature, time of baking, type of oven atmosphere, and circulation of oven air. He pointed out that the strength of the core depended directly upon the first two factors. Use of the lowest oven temperature that can be used economically from a time standpoint was advocated since it allows a greater factor of safety against over-baking when cores are not removed from the oven at the proper time and against over-baking thin sections of large, heavy cores.

Mr. Barnett pointed out that savings in fuel could be accomplished by minimizing the dead weight going into the oven. He cited instances where the weight of a steel core plate per pound of sand varied over the range of 1 to 20 pounds. To reduce this ratio it is necessary to use strong thin plates so constructed as to resist bending. Perforated plates are also helpful in eliminating extra weight.

The speaker stressed the need for a recirculating system to hold the oven temperature within the narrow 10 degrees Fahr. band necessary for uniform baking. In addition to temperature control sufficient oxygen must be introduced to insure the oxidizing atmosphere essential to the production of strong cores. Mr. Barnett stated that oil and gas are the most common fuels while coal is being used successfully in both stoker-fed and powdered fuel units.

N. E. Woldman, Eclipse Aviation Corp., Bendix, N. J., chairman of the education committee announced that the chapter's first educational course dealing with the fundamentals of foundry practice would start Nov. 13 at Essex County Boys' Vocational school, Newark, N. J. with three more lectures to follow during November and December.—*K. A. DeLonge, technical secretary.*

N. California

ANNUAL golf party and dinner of the Northern California Chapter of the A.F.A. was held the afternoon and evening of Oct. 11, Sequoyah Country club, Oakland, Calif., with an attendance of 70. The perfect California weather was responsible for a large turnout of golfers and the attendance at dinner was gratifying. The chapter's oldest and youngest foundrymen were present as well as many local supply men who were more interested in having a good time and witnessing the distribution of prizes to which they had contributed than to talking shop. Ivan L. Johnson, Pacific Steel Casting Co., Berkeley, Calif., and chairman of the chapter confined introductions to a few of the older members and to James L. Francis, Vulcan Foundry Co., Oakland, Calif., and chairman of the program committee, who announced the program prepared for the November meeting. Chairman of the entertainment committee, Al Snow, thanked the contributors and others who had helped to make the

(*Concluded on page* 83)

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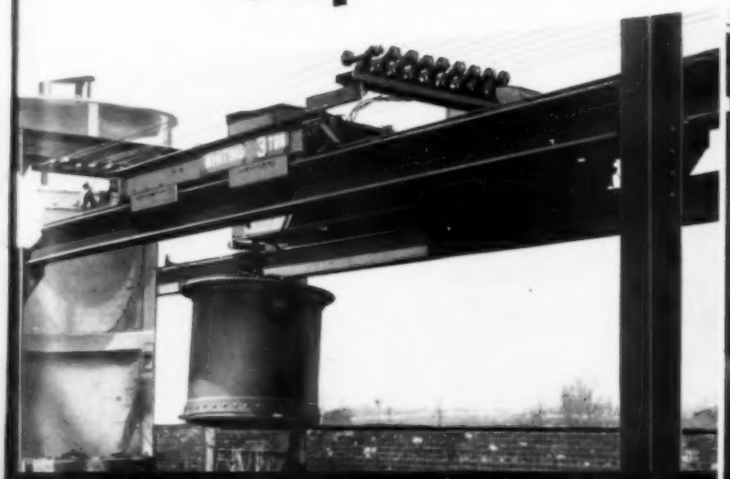
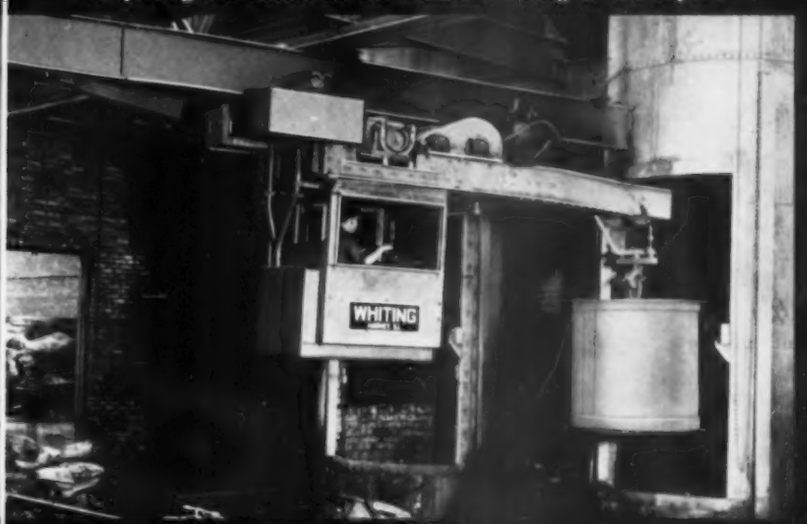


HORSESHOE TYPE—For serving a single cupola. This wishbone charger has a horseshoe trolley that travels on a fixed runway and straddles the cupola. Very popular in small jobbing foundries.

UNDERSLUNG TYPE—For serving several cupolas. The crane bridge runs parallel to the cupolas. The trolley has an underslung boom for placing the bucket on the wishbone casting in the cupola.

INCLINED SKIP-HOIST TYPE—For serving one cupola. Like other wishbone chargers, it distributes charges evenly, quickly, and smoothly. Yet, it has the low-cost features of the skip-hoist design.



MONORAIL TYPE—Consists of a special trolley with operator's cab attached, which travels on the lower flange of an overhead I-beam. By switching, it can serve more than one cupola.

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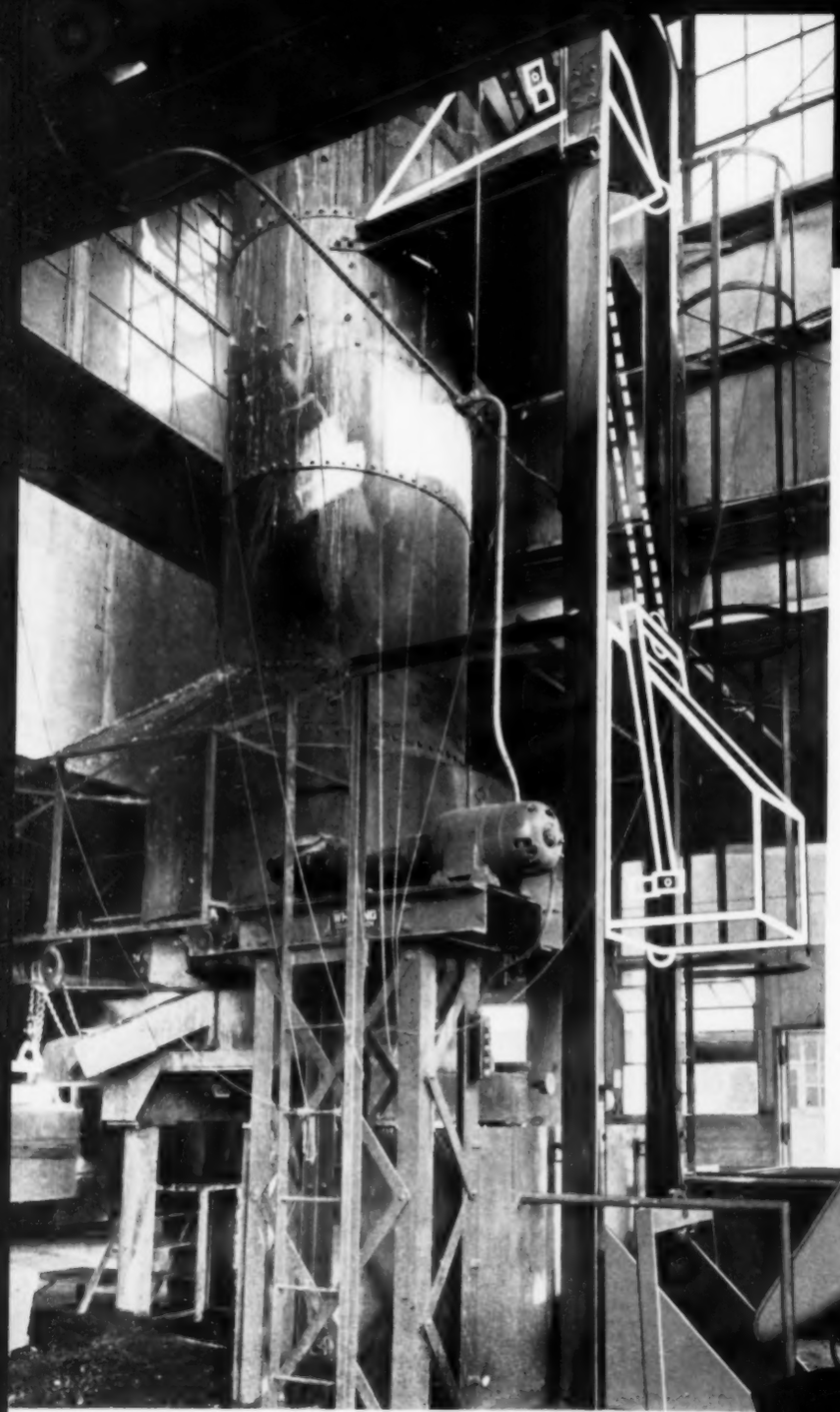
ONE MAN ALONE charges this 34" Cupola at the Master Foundry



WHITING SKIP-HOIST CHARGER CUTS COSTS AND RELEASES FLOOR SPACE

With this Whiting skip-hoist charger, one man is able to handle the entire charging of the 34-inch cupola in the Master Electric Co. foundry, at Dayton, Ohio. The cupola, operating 7½ hours, melts from 20 to 26 tons daily.

This mechanical charger makes other savings, too. It eliminates the need for a charging floor and elevator, provides useful floor area, eliminates the danger of overheating during hot summer months, and simplifies supervision. Furthermore, by permitting a high charging door, it effects a substantial saving in coke.

Whiting skip-hoist or wishbone type mechanical charging systems can be engineered to fit the special needs of your plant. If desired, payments can be extended over long time periods.

Whiting skip-hoist charger on a Whiting cupola in the Master foundry. Various positions of bucket are shown.

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(*Concluded from page* 80)

affair a success. E. M. Welch, American Manganese Steel division, Oakland, and vice chairman of the chapter did the honors of assigning golf and door prizes. Valentine and Carr, the Del Monte sand musicians led with popular songs and closed with "God Bless America."

An extremely interesting series of discussions was held at the regular meeting of the Northern California chapter held on Nov. 8. Previous to the technical meeting the new sound film of the Steel Founder's Society of America "Design of Steel Castings" was presented. Attendance at the meeting was 66. Technical session consisted of three discussion groups with leaders. One was conducted by Ben C. Page, F. K. Simonds Co., Berkeley, who led the discussion on M. A. Scott's paper "Production of Uniform Dense Structures in High Test Alloy Castings." Another under the direction of Earl McDonald, Monarch Foundry & Engineering Corp., Stockton, reviewed features of the paper "Application of Controlled Directional Solidification of Large Steel Castings," by J. A. Dunn and S. W. Brinson. The third group with discussion leader J. R. Scott, Kingwell Bros., San Francisco, studied the paper "Analysis of Nonferrous Foundry Defects."—*George L. Kennard, secretary.*

N. Ill.-S. Wis.

REGULAR monthly meeting of the Northern Illinois-Southern Wisconsin Chapter of the A. F. A. was held at Freeport, Ill., Nov. 12, with 50 present to hear A. W. Gregg, Whiting Corp., Harvey, Ill., speak on "Cupola Operation." P. A. Paulson, Gunite Corp., Rockford, Ill., and chairman of the chapter, presided.

Mr. Gregg discussed the operation of the cupola step by step through the day's heat. He started at the time when the slag from the previous heat was chipped out and extended the discussion to the point where the bottom was dropped. He listed the general characteristics of all cupolas and stressed the fact that each cupola works better when it has a great deal of attention. Mr. Gregg distributed tables giving the physical characteristics and operating conditions recommended by his organization for various sizes of cupolas. An interesting discussion, in which most of the members present participated, followed the formal presentation.

The Christmas party of the chapter will be held at the Hotel Faust, Rockford, Ill., on Dec. 7. Features of the evening will include a good meal, a good show and a good time. *J. R. Cochran, technical secretary.*

To Discuss Foundry Cost Analysis

University of Minnesota, Minneapolis, will hold an "Institute in Foundry Cost Analysis," Dec. 5, 6 and 7 at the Center for Continuation Study on the main campus of the university. Purpose of the institute is to keep executives, professional men and graduates posted on new methods and developments. Meetings are held mornings, afternoons and nights, similar to college lecture and class room work. Tuition fee is $6 plus hotel accommodations, if such are desired.

Faculty of the institute will include John H. Diedrich, manager, Blackhawk Foundry & Machine Co., Davenport, Iowa; W. W. Rose, executive vice president, Gray Iron Founders' society, Cleveland; Albert E. Grover, foundry cost consulting, engineer and member of the advisory staff of THE FOUNDRY, Cleveland; Don J. Reese, development and research division, International Nickel Co. Inc., New York; Robert Leicht, superintendent, Winona Foundry & Machine Co., Winona, Minn.; Prof. C. A. Koepke, professor of industrial engineering; Prof. Fulton Holtby, assistant professor of mechanical engineering; Herbert F. Scobie, instructor of foundry practice; Jarl Havenen, assistant instructor of foundry practice, and Julius M. Nolte, director of Center for Continuation of Study—all staff members of the University of Minnesota.

Tentative program of the Institute is as follows:

Thursday, Dec. 5

9:00 to 9:30 a.m.—Introduction, by J. M. Nolte and Fulton Holtby.
9:30 to 11:00 a.m.—The Necessity of Accurate Cost Analysis in Selling of Castings, by W. W. Rose.
11:00 to 12:00 m.—Cost Estimates versus Wild Guesses, by Albert E. Grover.
12:00 to 1:30 p.m.—Luncheon in Center dining room.
1:30 to 3:00 p.m.—Job Evaluation, by John H. Diedrich.
3:00 to 4:30 p.m.—A Simple Cost System for a Small Foundry, by Robert G. Leicht.
6:00 to 7:00 p.m.—Dinner in Center dining room.
7:00 p.m.—Round table discussion of enrolees' problems relating to subject matter of the institute led by the faculty.

Friday, Dec. 6

9:00 to 10:30 a.m.—Necessity of Sound Pricing in the Selling of Castings, by W. W. Rose.
10:30 to 12:00 m.—Melting Control in Relation to Costs, by Don J. Reese.
12:00 to 1:30 p.m.—Lunch in Center dining room.
1:30 to 3:00 p.m.—Foundry Cost Analysis, by Albert E. Grover.
3:00 to 4:30 p.m.—Operation of the Iowa Cost System, by John H. Diedrich.
6:00 to 8:30 p.m.—Dinner in Center dining room. Presiding: Charles A. Koepke.

Saturday, Dec. 7

9:00 to 12:00 m.—Melting Control in Relation to Costs, by Don J. Reese.
12:00 to 1:30 p.m.—Lunch in Center dining room.
1:30 to 4:30 p.m.—Round table discussion of enrolees' cost and melting control problems led by the faculty of the institute.

Northern California Chapter's golf party was a huge success. Illustration at lower right shows, left to right, Pete Valentine, Del Monte Properties, vice chairman, and Al Snow, Snow & Galgiani, chairman of entertainment committee

Foundry Equipment Makers Meet

The annual meeting of the Foundry Equipment Manufacturers association, held at The Homestead, Hot Springs, Va., Oct. 25 and 26, was the best attended in recent years. The meeting was devoted to consideration of the various activities of the association, and the discussion of several subjects of particular interest to the industry at the present time.

In opening the meeting, P. J. Potter, Pangborn Corp., Hagerstown, Md., and president of the association, spoke of the seriousness of the situation now facing the country. He stressed the importance of every company putting its individual house in order, and laying plans for the closest co-operation between all companies in the foundry equipment manufacturing industry. Mr. Potter spoke of the work of the finance committee, under the chairmanship of R. W. Hisey, Osborn Mfg. Co., Cleveland; the membership committee under the leadership of Thomas Kaveny Jr., Herman Pneumatic Machine Co., Pittsburgh; the statistical committee headed by Otto A. Pfaff, American Foundry Equipment Co., Mishawaka, Ind., and the association's representative on committee Z-9, sectional committee of the safety code for exhaust systems of the American Standards association through S. C. Vessy, W. W. Sly Mfg. Co., Cleveland, and V. E. Minich, American Foundry Equipment Co. He also paid tribute to the work of Arthur J. Tuscany, secretary, and the association staff.

William F. Patterson, chief of the apprentice section, division of labor standards, department of labor, Washington, presented an interesting and instructive talk on, "Training Within Industry for Defense." The speaker indicated that the two major needs in connection with the labor supply for national defense include, 1—Semiskilled specialists and 2—A comparatively smaller number of highly skilled men. Training of the semiskilled men can be carried on in a relatively short time within industry and in connection with the existing vocational educational facilities and other available agencies capable of providing assistance. This training for such jobs can be speeded up immeasurably in the opinion of the speaker. On the other hand, the time required for training apprentices to become skilled mechanics cannot be shortened appreciably. Nevertheless, an integral part of the national defense program must be the immediate expansion of apprenticeship, particularly in the national defense industries.

Mr. Patterson stated that every plant should be training workers for the future, not only for its own purposes, but also for the continuance of our industrial civilization as a whole. A well balanced program provides not only for efficient training in trade skills, but allows time enough for the apprentice to mature as a responsible worker. On the other hand the program should enable each apprentice to progress according to his individual learning ability. Some apprentices thus are able to complete the entire program in a somewhat shorter time than the established period. The speaker emphasized the splendid job being done by trade associations in the apprentice training field.

Lt. Col. Ray M. Hare, chief of the facilities division, army and navy munitions board, Washington, discussed, "The National Defense Program and Its Effect upon Industry," with particular reference to the foundry equipment field. The speaker described plans, procedures and methods which are in the making or are in use by various government departments industry and in working on the defense program. He stressed vigorously the need for close co-operation of all units of any industry.

One of the interesting features of the program was a discussion of the present and future position of the foundry industry by the various company representatives present. This was followed by round table discussions on "Sales and Use Taxes," "Ways of Increasing Profits," and "Acknowledging Orders without Accepting Same."

Election of the following new directors was announced at the meeting: Robert S. Hammond, Whiting Corp., Chicago; H. S. Hersey, C. O. Bartlett & Snow Co., Cleveland; and Otto A. Pfaff, American Foundry Equipment Co. At a meeting of the board, P. J. Potter was re-elected president and Thomas Kaveny Jr. vice president.

Over 300 Register At St. Louis

St. Louis District Chapter of the A. F. A. has met with surprising success and an unexpectedly large attendance at its elementary foundry practice school.

Over 300 have registered and have been in attendance at this practice school. Held weekly, on Wednesday night, subjects are given in accordance with a planned program dealing with molding and other kindred subjects.

School will continue throughout the next two or three months and it is planned on extending the course from 12 to 18 lectures.

Chapter Holds Fall Lecture Course

Metropolitan New York-New Jersey Chapter of the A.F.A. is holding an educational lecture course under the title, "Castings Clinic for Designers and Users." The first lecture of the fall term was held Nov. 13 at the Essex County Boys' Vocational school, Newark, and was devoted to a discussion of, "Pattern and Casting Design," by Frederick G. Sefing, International Nickel Co., New York. Sam Tour, Lucius Pitkin Inc., New York, discussed, "Melting Metals and Pouring Castings," at the Nov. 20 meeting and William G. Reichert, American Brake Shoe & Foundry Co., Mahwah, N. J., spoke at the Nov. 27 lecture on, "Condition of the Foundry Sand Affects the Castings." The final lecture of the fall term will be held Dec. 11, and will be devoted to a discussion, "Types of Castings as Influenced by Molding Method," by Dr. N. E. Woldman, metallurgist, Eclipse Aviation Corp. The winter term, which will be a continuation of the fall term, will be held early in 1941 and will cover various kinds of gray iron, steel, malleable, and nonferrous castings and their properties.

Is Representative

Chamberlain Co., Inc., Los Angeles, has been appointed representative of the Royer Foundry & Machine Co., Kingston, Pa. for the sale of sand separators and blenders, shakeouts, and other equipment of the firm in the state of California.

Enlarges Exhibit

Museum of Science and Industry, Jackson park, Chicago, recently opened the completed central pavilion which incorporates a new and greatly enlarged iron and steel exhibit area. An operating gray iron foundry fully equipped, and many exhibits of castings and materials used in foundry practice are located in the iron and steel section of the museum. Description of the foundry which was installed under the sponsorship of the Chicago Chapter of the American Foundrymen's association, was presented in THE FOUNDRY for January, 1940.

Firm Organized

Pollard Oil Products Co., 1627 South Forty-fourth street, Milwaukee, has been organized by Millard A. Pollard and Darold W. Thiem. The company specializes in industrial lubricants, core oils and refractory core and mold washes.

Send for your copy of this new book

This informative, new 24-page book, "DUST IN INDUSTRY" gets "down to earth" on both the theory and practice of dust collection, cites practical examples, offers many valuable suggestions. A copy will be sent any executive or engineer upon request. Just write BUELL ENGINEERING CO., INC., 14 Cedar Street, New York, or B.F. STURTEVANT CO., Hyde Park, Mass.

buell
DUST COLLECTORS

A Short, Short Story on Efficiency

■ The time is about December 1st, 1940. The place, a foundry office to the loo'ard of the cupola in the east bay. There are two characters, a president and foundry superintendent of a busy shop anywhere in the United States.

PRESIDENT: *Good morning, Bill, how are you this morning?*

BILL: *Fine, that job for 10,000 pieces is going through the shop today . . . without a hitch, so far.*

PRESIDENT: *Take it all in all, the shop has plenty of work, the men are busy and things look favorable all 'round.*

BILL: *Yeah, but the trouble is, you and I can't see everything. It's too darn easy for us to slip up on an idea that might be just what we're looking for, to increase our production and cut our costs. I wish we could figure out a way to keep our foremen, supervisors and straw bosses posted on new methods, equipment and materials for handling some of these jobs.*

There is a way, Mr. Foundryman. To assure your key men of complete information on modern casting practice, send each of them a personal copy of The FOUNDRY. It is the trade paper for them to read.

And you can tie it in with the Xmas season. We will gladly send the December issue free, with a gift card, to each of the men whose names and addresses you send us, starting their regular subscription with the January, 1941 issue. Why not do it today? *The FOUNDRY*, Penton Building, Cleveland, Ohio. $2.00 per year; $5.00 for three years.

FOUNDRY DEVELOPMENTS AT SHORT RANGE

NAILING the face of large molds to hold the sand in place is a tedious, time-consuming, but necessary job. However, in one foundry it has been found advantageous to stand the nail heads on the pattern and riddle the sand over them instead of forcing the nails into the sand after the mold is rammed. The procedure of course, only can be used where the pattern face is horizontal or nearly so. While the time required to stand the nails in position is approximately the same as for the usual practice, the advantage lies in elimination of repair work around the nail heads, particularly where sharp edges must be maintained. With ordinary care only a few nails are knocked over during riddling the sand, and they easily are placed correctly.

* * *

Monel metal can be colored black or given what is termed an "ebonized finish," by dipping in a solution containing 12 grams per liter of potassium sulphide and 200 grams per liter of ammonium chloride. The solution is maintained at 160 degrees Fahr. or above, and coloring is accomplished in about 3 minutes.

* * *

It is claimed that a newly developed process provides a low cost easy method for electroplating aluminum and its alloys. It consists of a 2 to 4-minute dip in a special solution after which the piece is ready for any regular plating bath using an alkaline solution. Nickel, chromium and other metals using an acid bath are plated over a copper coat developed in previous alkaline bath.

* * *

Due to the shortage of copper and tin in Germany for other than military purposes, use of other nonferrous metals such as zinc, aluminum, and magnesium practically is mandatory by governmental decree. For example bearings now are made from a zinc alloy containing about 95 per cent zinc of 99.9 per cent purity, 4 per cent aluminum, 1 per cent copper and a small amount of magnesium. Wear resistance is claimed as good as for copper-base alloys as are tensile strength, yield point and brinell hardness. However, compressive yield point is only about 12½ per cent, and elongation about 25 per cent that for copper-base alloys.

* * *

CAST alloy steel chain has given excellent service for anchor chain. Containing nickel, chromium and molybdenum, the composition range for high strength chain is as follows: Carbon, 0.30 to 0.35 per cent; manganese, 0.80 to 1.00 per cent; nickel, 1.50 to 1.75 per cent; chromium, 0.45 to 0.60 per cent, and molybdenum, 0.20 to 0.30 per cent. Tensile strength of test coupons showed 142,500 pounds per square inch with a yield point of 129,000 pounds per square inch. Heat treatment procedure was to heat to 1600 to 1650 degrees Fahr. and hold for 1-hour per inch of section, quench in water, reheat to 1050 to 1150 degrees and hold for 1-hour per inch of section, and cool in air.

* * *

While heat treated aluminum alloys generally exhibit higher physical properties than those which cannot be so treated, a recent invention claims attainment of highly desirable characteristics without necessity of heat treatment. Advantages of the alloy are high tensile strength, suitable hardness, high degree of elongation, resistance to oxidation and corrosion, fine grain, and good machining characteristics. Range of composition shows 93.35 to 94.95 per cent aluminum, 0.15 to 0.25 per cent titanium, 1.50 to 2.00 per cent copper, 1.25 to 1.75 per cent tin, 0.75 to 1.75 per cent zinc, and 0.40 to 0.90 per cent magnesium. Tensile strength of the alloys ranges from 27,500 to 30,000 pounds per square inch and the elongation from 6 to 8 per cent.

* * *

To obtain chromium steel with uniform predictable hardness, and with the elimination of nonmetallic inclusions which sometimes occur, one inventor has developed a method employing two melts. One of the melts, containing most of the chromium is melted in the cupola with all pig iron, pig iron and steel scrap, or all steel scrap to secure a high carbon metal. The other regular steel charge is melted in an open hearth, electric furnace, etc. and refined to obtain a low carbon bath. Then the two are mixed together in suitable proportions to obtain the final desired composition. Other alloying agents such as nickel, vanadium, molybdenum, etc. may be added with either melt. It is claimed that the process gives steel which is harder and tougher than when produced in the regular manner.

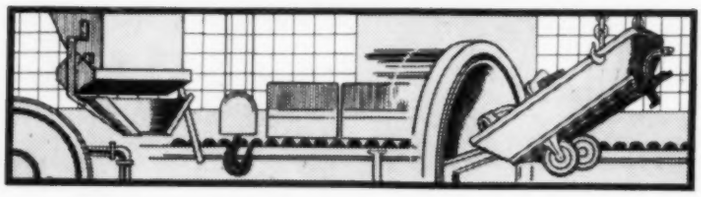
* * *

EASTERN foundry now is advertising that its stainless steel pipe fittings and valves are finished by a process which not only cleans and brightens plain or ornate surfaces but also provides smoother surfaces. It also is claimed that the process improves machinability owing to a more uniform removal of scale, and is used successfully in cleaning odd-size, odd-shape castings which formerly were considered impractical or impossible to polish.

* * *

It is reported that copper containing tellurium as an addition to gray cast iron gives a different effect than when pure or virgin copper is employed. No information was given on the difference, but the inference is that it was beneficial. Possibly its effect might be to give finer grain and hardness as it does in lead.

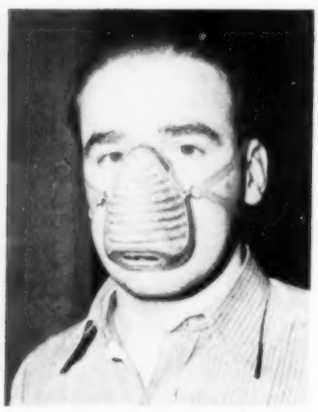
NEW EQUIPMENT



AND SUPPLIES

Respirator

American Optical Co., Southbridge, Mass., has developed a respirator, shown in the accompanying illustration, to protect the respiratory



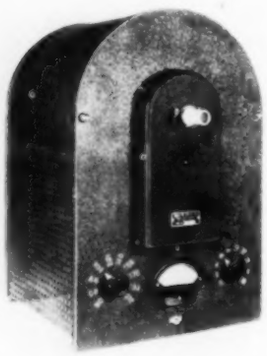
system against dust, pollens and certain bacteria. The device weighs only 1½ ounces, excludes particles as small as a micron—1 25,000 of an inch—and provides protection for those working in dusts, persons allergic to pollens causing hay fever and asthma, and doctors, nurses and patients exposed to certain air borne bacteria. According to the announcement the effectiveness of the new respirator is due to four improvements: A new method of making the filter unit; a new and efficient exhalation valve; a new self equalizing double head band; and a facial design which enables one to wear the device with comfort.

Core Coating

Glyco Products Co. Inc., 148 Lafayette street, New York, recently has placed on the market a new type of wetting agent which when incorporated in a core wash for nonferrous work is claimed to provide a smooth hard surface on the core. Suggested mixture contains 1 pint molasses, 10 pounds graphite, 1 pound wetting agent and water to make 5 gallons. Coating compound is designed for dipping cores after regular baking, and cores must be rebaked. It is said that after dipping the cores do not have to be suspended to permit dripping of excess coating since when the cores are withdrawn from the solution they break away evenly.

Combustion Furnace

Harry W. Dietert Co., 9330 Roselawn avenue, Detroit, has developed a combustion furnace, as shown in the accompanying illustration, for carbon and sulphur determinations by combustion method of all metals. The furnace also is adaptable for combustion of coal, coke and oils for determination of sulphur with Leco sulphur determinator. Furnace, transformer, pyrometer, voltage control switches and power switch are



built into an integral unit and housed in a single case. Three globular heating elements, spaced equally around the combustion tube produce a uniform high temperature zone 6 inches in length.

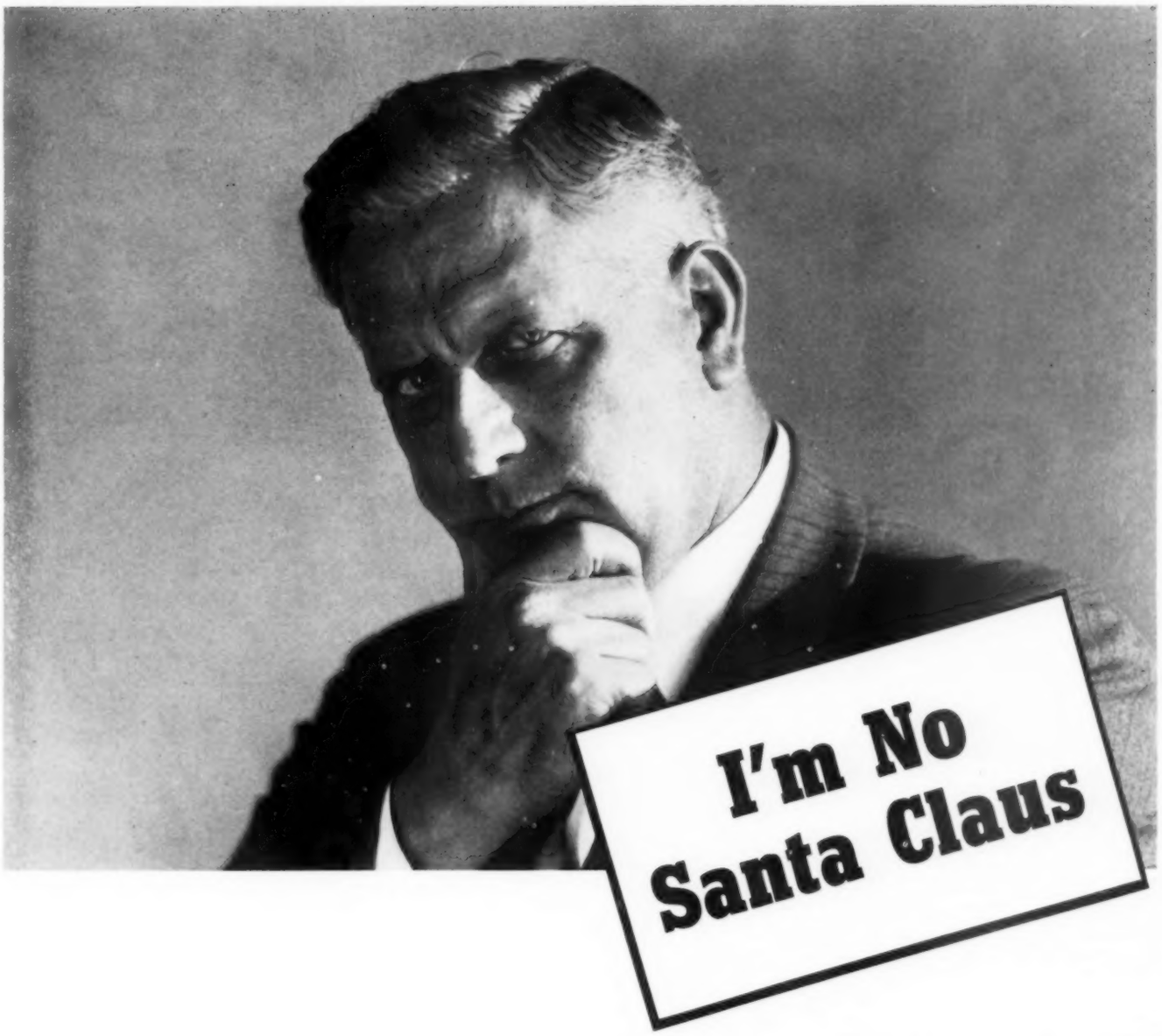
Combustion tube is held securely on each end by a clamp faced with an asbestos gland. Wiring, switches and transformer are enclosed and well ventilated. Two rotary switches in front select the proper voltage for maintaining any desired temperature. Temperature is indicated by a fan shaped compensated pyrometer meter. A platinum-platinum rhodium thermocouple insures accuracy and long life. The furnace, 16 inches diameter, may be surrounded with a heavy wall of insulating brick or other material to conserve electrical power

Graphitizing Alloy

Electro Metallurgical Co., New York, has developed a new graphitizing alloy composed essentially of silicon, manganese and zirconium for ladle addition to cast iron. The alloy which is termed, "SMZ," is said to be particularly effective in producing certain beneficial results including the conversion of a normally hard, white iron into a high strength iron; reduction of chill of gray iron and minimization of wall sensitivity—prevention of chilling of thin sections, and improvement of the microstructure of the iron with resultant improvement in strength and physical properties.

Pyrometer

Illinois Testing Laboratories, Inc., 420 North LaSalle street, Chicago, has introduced an all purpose surface temperature pyrometer presenting many interesting features, including a heavy shock resisting movement, immune to shocks and jars and more suitable for portable use. Offset handle equalizes weight balance. Enlarged assortment of thermocouples provide greater utility. All thermocouples are interchangeable with other units regardless of range without re-calibration or adustment. Quickly detachable rigid or flexible arm permits a compact carrying case.



"I may be a sentimental, generous old fool when it comes to playing Santa Claus to my family on Christmas day, but when it comes to dishing out hard-earned cash for machinery and plant equipment—Mister, I'm no Santa Claus! When I buy machinery it's got to produce, or else!

"Molding equipment used to be a particular 'bug-a-boo' to me until I installed my first Herman Jarr-Rollover and Pattern-Drawing Machine. It didn't take me long to see the light after that. I figured it was costing me money every day I operated my old equipment, so it wasn't long before I had my molding department completely Herman equipped.

"And Mister, if you feel like I did, you feel that you've been 'sucker' long enough. It's time to stop playing Santa Claus. Call in the Herman People now!"

Herman representatives are available to discuss your molding problems. These consultations do not obligate you in any way. A request on your business letter-head will bring you an experienced Herman foundry engineer at the earliest opportunity.

MOLDING HERMAN MACHINES

HERMAN PNEUMATIC MACHINE CO., UNION BANK BUILDING, PITTSBURGH, PA.

Metal Abrasives

National Metal Abrasive Co., Cleveland, has developed a process whereby it is claimed that each size of steel shot and grit is controlled so that it possesses the best degree of toughness and hardness in relation to that size. With that control of degree of hardness and toughness it is said that entirely different results are obtained, and that shot and grit may be purchased for abrasive cleaning, hardening or finishing so as to give the most advantageous results.

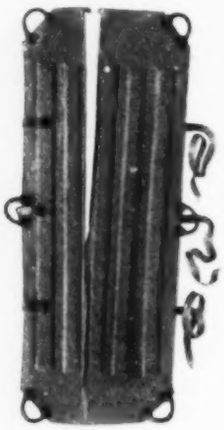
Grinder

Hammond Machinery Builders, Inc., 1605 Douglas avenue, Kalamazoo, Mich., announces a new addition to its extensive list of grinders

in a multi-V belt driven wide swing grinder, as shown in the accompanying illustration. This is a four bearing machine with totally enclosed fan cooled motor mounted outside the base. It is claimed to be an excellent grinder for bulky castings. Also an efficient machine since the operator is not limited to standard motor speeds. It is particularly desirable in 25 cycle areas. Regardless of the slower speed of 25 cycle motors compared to 60 cycles, proper size sheaves can be supplied to drive wheels at any desired efficient grinding speed.

Stretcher

Industrial Products Co., 800 West Somerset street, Philadelphia, announces a new stretcher combining features for better and more comfortable handling of injured persons. Flexible type can be used in most otherwise inaccessible places, narrow passageways, up or down ladders or circular stairways, raised or lowered perpendicularly through trap doors, man holes, etc., where there is room for only one person at a time. Patient is securely strapped in the stretcher and is as safe and comfortable as is possible under the circumstances. A desirable feature is the zipper which runs the length of the stretcher and eliminates the

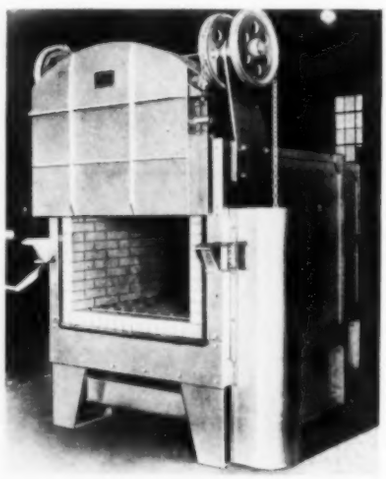


necessity of lifting the patient. Stretcher is placed on the cot, zipper is drawn and the stretcher lifts out in two sections. Special fastener acts as safe guard and prevents opening of the zipper on the journey. The stretcher is full size and folds compactly to 6 inches by 4 feet 10 inches.

Tempering Furnace

Lindberg Engineering Co., 221 North Laflin street, Chicago, has developed a new box type, electrically heated furnace for heat treatment of castings and other materials. The furnace, which is shown in the accompanying illustration, is made in several sizes with hearths ranging from 24 x 36 inches and 18 inches high to 48 x 60 inches and 30 inches high. Furnaces also are built in two temperature operating ranges from 200 to 850 degrees Fahr., and from 200 to 1250 degrees Fahr. The furnace utilizes the forced convection heating principle in which a pressure, blower type fan forces heated air around the work.

Furnace is lined with light-weight refractory insulation, and the heating elements are nickel-chromium wire formed into helical coils. Elements are supported by an insulated plug which rests on top of the furnace, and they can be removed without cooling the chamber or disturbing the charge. An air switch operated by the fan permits the elements to heat only when the fan is running at normal speed. The furnace is supplied with a heavy cast grid on which the work can be loaded, but sliding grids can be supplied as well as special handling equipment.

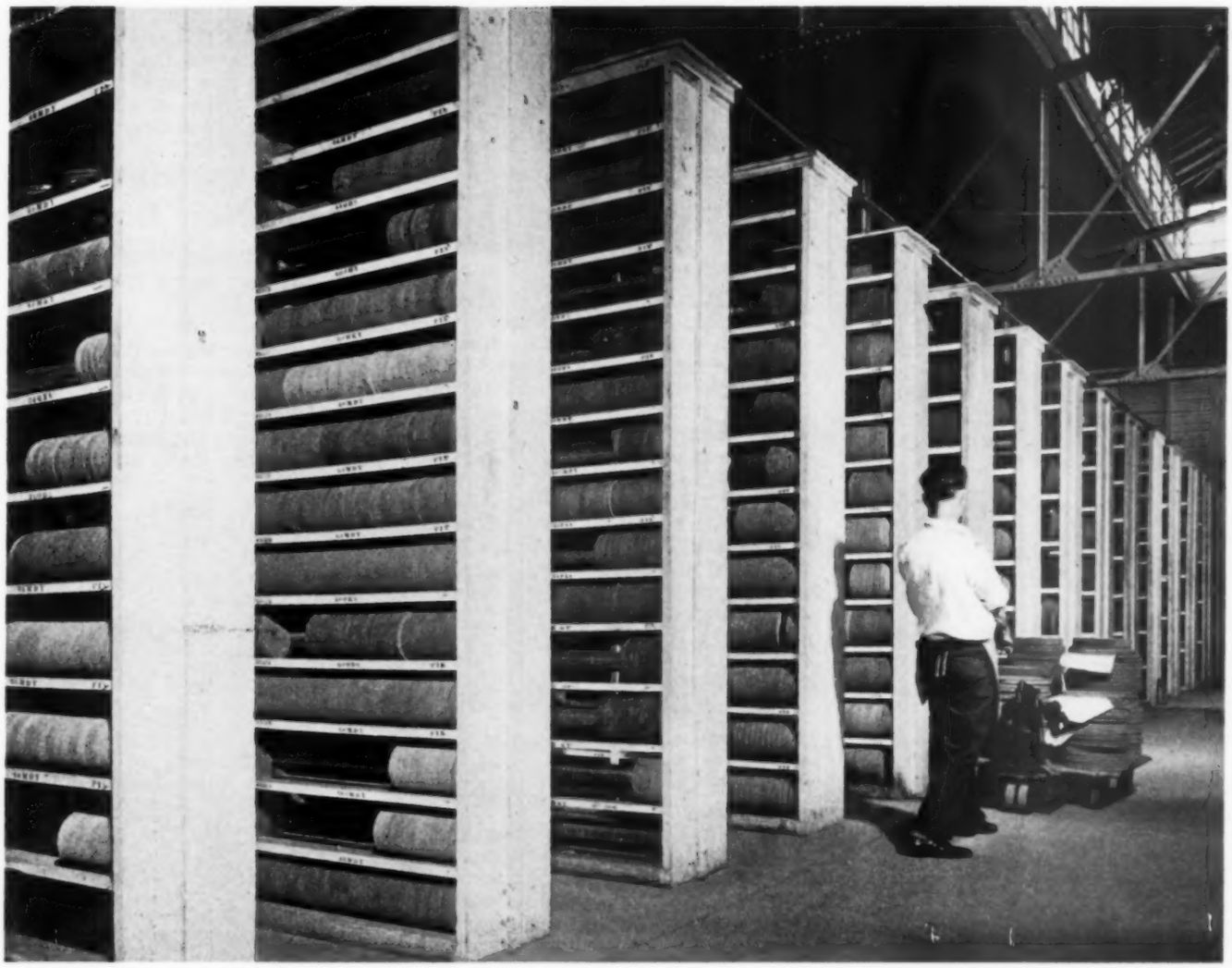


Oil Flusher

J. A. Honegger, 223 Spruce street, Bloomfield, N. J. has designed a portable pressure oil flusher and dispenser for use in flushing out and oiling machinery. The manufacturer points out that every bearing on reciprocating and rotating equipment should be flushed and re-oiled at regular intervals to remove minute particles of dirt, grit and metal to reduce wear and friction to a minimum. It is claimed the new unit does this thoroughly. Oil is introduced into the bearing at 60 to 100 pounds pressure per square inch by air or gas pressure. The unit is claimed to handle oils of any viscosity from that of kerosene to heavy transmission oil for gear reduction drives. The device holds one quart and is readily carried in the hand. The unit is self contained and can be used on any job regardless of whether air or power connections are available.

Regulator

Alexander Milburn Co., West Baltimore street, Baltimore, has developed a new type twin stage regulator in which the first stage can be adjusted to various pressures, thus permitting it to be used for different operations. After the selected pressure is set, the delivery stage may be adjusted to any desired working pressure up to 200 pounds or more. It is claimed the unit operates smoothly and permits uniform delivery. Special feature in a simplified construction is a unitary valve assembly used in both stages. The assembly has only four parts, a small body, stainless steel spring, stainless steel ball and special seat operated by a monel metal pin. Seating is with instead of against the pressure. Each stage has a loose, replaceable diaphragm and removable and interchangeable inlets adaptable to any tank or line connection for any type of gas. The first stage can be purchased separately and attached to practically any single stage regulator thus converting it to two stage control.



GRINDING WHEEL SERVICE FROM STOCK!

Increased production in the metal-working industries is demanding quicker deliveries on grinding wheels. In most instances, you can eliminate bottle-neck delays in your grinding department *by specifying factory stock items.*

Abrasive Company carries many thousands of all sizes, shapes and grain and grade combinations of grinding wheels and other bonded abrasive products in Philadelphia factory stock at all times for immediate shipment. If you know what this stock is you can select stock items for your needs. Write today for our new FACTORY STOCK LIST, issued November, 1940, showing both Philadelphia Factory and Chicago Branch Stocks.

In addition, local stocks are carried by leading mill supply distributors in all industrial centers. There is one near you.

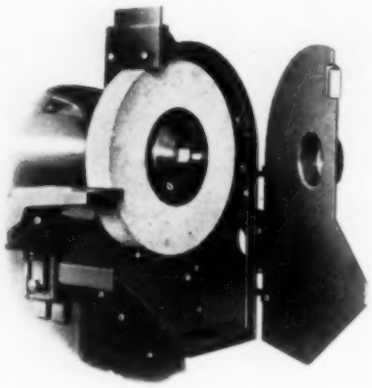
ABRASIVE COMPANY

DIVISION OF SIMONDS SAW AND STEEL CO.

TACONY & FRALEY STS., PHILADELPHIA, PA. • DISTRIBUTORS IN ALL PRINCIPAL CITIES

Pedestal Grinder

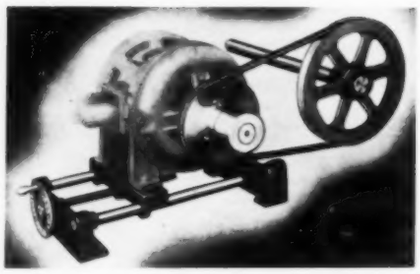
Hisey-Wolf Machine Co., Cincinnati, recently has placed on the market a new design pedestal grinder. The machines are built in 18 and 20-inch wheel sizes. Motors are totally enclosed and vented through the large pedestal. Air circulates continuously through the motor, out of the one motor foot into the pedestal and then into the other motor foot and through the motor again. The machines can be equipped with new guards, shown in the illustration. It is claimed that it is impossible for any object to jam in between the wheel and the guard which extends far beyond the periphery of the wheel so that all sparks



and chips are arrested. The flange on the outside makes an easy connection to any regular type dust collection system.

Speed Controller

Reeves Pulley Co., Columbus, Ind., has added a variable speed controller to a wide range of speed control equipment. It is claimed that with this new unit any standard constant speed motor from fractional to 1½ horsepower may be converted into a variable speed unit. No special shaft extension is required. The unit includes a disk assembly and adjustable motor base. The disk assembly consists of two cone shape disks, one stationary and one laterally adjustable, a self adjusting tension spring, a spring nut and cover and is applied direct to the standard shaft extension of the motor mounted on the adjustable base. The motor is moved forward or back by a hand wheel. When nearest to the drive sheave the V-belt runs over the largest diameter on the disks to secure maximum speed. Reversing the hand wheel moves the motor away from the driven sheave and the belt runs over the small diameter (the adjustable disk moving out to accommodate the belt) and the speed is reduced. It is claimed that speed variation is infinite with-

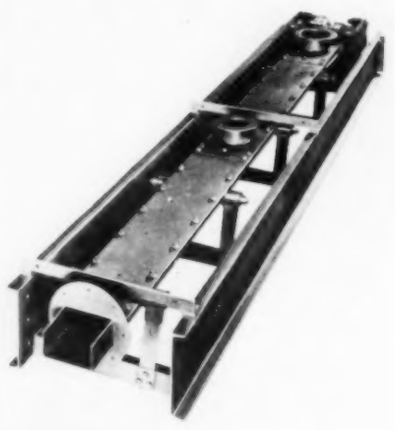


in the limits of the unit. A countless number of operating speeds is available without steps or jumps while the machine is running. The new junior type speed controller is built in six different sizes for use with motors from ⅛ to 1½ horsepower and in control range from 1¾ to 1, to 2¾ to 1. Two sizes of motor bases are available. Either size may be used with any of the six disk assemblies. The unit also is available in a counter shaft type for unusual speed reduction or speed increase.

Vibrating Conveyor

Ajax Flexible Coupling Co., Westfield, N. Y., has introduced a vibrating conveyor featuring totally enclosed design, minimum head room, rubber shackled pan mounting and self contained reciprocating drive. The conveyor, shown in the accompanying illustration, is equipped with two intakes and a single discharge. Flanges are provided for flexible boots on intake and discharge openings for convenient, dust proof connections to hoppers and chutes.

Low head room conveyors are available in standard and special lengths up to 50 feet or more and in widths up to 4 feet. They readily can be installed in series for long distances. Driving mechanism is self-balancing and applies the reciprocating motion directly to the conveyor pan thereby eliminating transmission of vibration to the surrounding structure. Horsepower required is small and it is claimed



maintenance cost is negligible. The newly developed rubber bushed shackles connecting the supporting springs to the pan result in smooth and uniform action and high conveying speeds. Shackles require no lubrication.

Band Saw Brake

Tannewitz Works, Grand Rapids, Mich., has introduced a hydraulic two-wheel brake for band saws which operates automatically in case of saw breakage. Similar in construction to the automobile brakes and perfectly synchronized, the brakes automatically bring both wheels to a dead stop within an instant after saw blade breaks thus

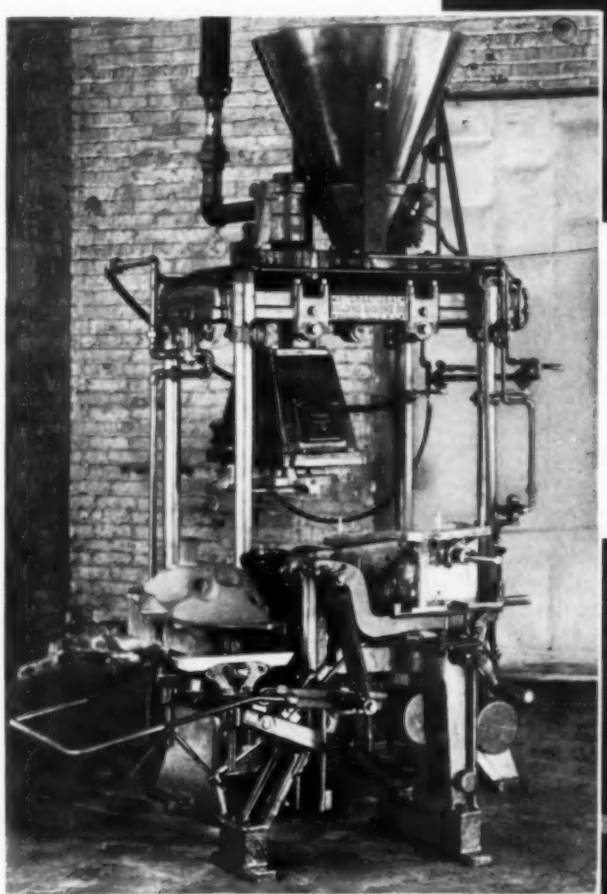
completely eliminating the hazard of a whipping, broken blade. The brakes are applied automatically when the current is shut off. In case of a blade breakage a saw tension lever snaps back the instant the breaking saw relieves the tension and presses a switch button which automatically shuts off the current and applies the brakes. An additional advantageous feature is that both wheels may be stopped at will without throwing the least strain on the saw blade by push button control at the front of the machine.

Hauling Bucket

Brooks Equipment & Mfg. Co., Knoxville, Tenn., has developed a detachable bucket equipment for truck hauling which it is claimed is mounted easily on any standard chassis. Correct load distribution well forward of the rear axle eliminates excessive strain on the chassis and enables a 1½-ton truck to carry a fully loaded 2 cubic yard bucket. A unique jack leg device attached to the rear end of the frame relieves the truck chassis.

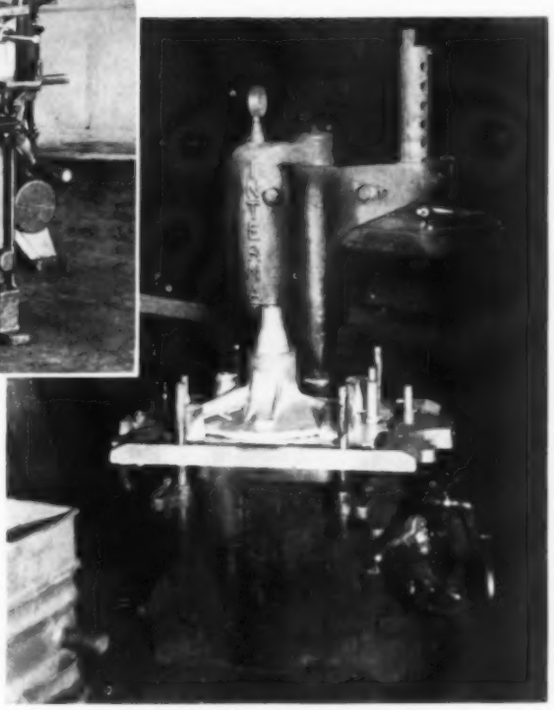
INTERNATIONAL
Molding Machines
are built in
70 Standard designs
900 different sizes
also
a vast variety of Special
Designs for work
of unusual character

Type JDP
Jolt ram Power lift machine



Type SB 13 Core Blower
and Type R machine, for
clamping, turning over
and drawing.

HIGH PRODUCTION schedules
can be continuously maintained
by using
INTERNATIONALS



Type PKL Jolt Squeeze
Power Pin lift machine

INTERNATIONAL
MOLDING MACHINE
COMPANY
2608-2624 W. 16th St.
Chicago, Ills.

Foundry Activities

NORTH American Aviation, 5701 Imperial highway, Los Angeles, Calif., is erecting a 40 x 120 foot addition to its foundry building. The new structure, being built by the Austin Co., 777 East Washington boulevard, Los Angeles, will be two stories in height and of steel frame construction.

* * *

St. Paul Foundry Co., 500 Como avenue, St. Paul, has let general contract to Lawrence Peterson Construction Co. for a foundry addition.

* * *

Repcal Brass Mfg. Co., 2215 East Twenty-seventh street, Los Angeles, Calif., is building an addition to its plant at an estimated cost of $2500.

* * *

Sterling Foundry Co., Wellington, O., is building a 1-story 70 x 100-foot steel coreroom addition to its foundry, costing $40,000.

* * *

Globe Steel Casting Co., Milwaukee, is building a foundry addition 36 x 220 feet.

* * *

Theo. Kupfer Foundry & Iron Works, Madison, Wis., is making extensive improvements to its foundry.

* * *

Kelsey-Hayes Wheel Co., Detroit, is building a plant and boilerhouse in Plymouth, Mich., 280 x 840 feet. Giffels & Valley Inc., is architect.

* * *

R. Perlick Brass Co., Milwaukee, is remodeling the old Mayhew plant at a cost of $20,000. Selzer-Ornst Co. has contract.

* * *

Sivyer Steel Casting Co., Milwaukee, is building a foundry addition 36 x 220 feet, costing $30,000. Klug & Smith are contractors.

* * *

Reading Steel Casting Co., Tulpehocken street, Reading, Pa., is building a machine shop to cost approximately $75,000.

* * *

Duriron Co., 450 North Findley street, Dayton, O., is building a 100 x 180-foot foundry and 25 x 170-foot warehouse to cost over $40,000.

* * *

Ampco Metal Inc., Milwaukee, is constructing a plant addition of 8000 square feet to be used as a foundry.

* * *

Kitson Co., a subsidiary of Welsbach Street Illuminating Co., Philadelphia, has secured exclusive rights for the manufacture and distribution of a self-lubricating bearing metal which is described as a solidified emulsion of lead in copper produced by a special process. Morse DellPlain is president of the Kitson Co.

* * *

Permold Co., East Cleveland, O., is building a 2-story 80 x 360-foot plant at Medina, O., at a cost of approximately $125,000, for manufacture of aluminum products.

* * *

Forest City Foundries Co., 2500 West Twenty-seventh street, Cleveland, is enlarging its branch plant at 9327 Maywood avenue. Addition covers about 4700 square feet.

* * *

Griffin Wheel Co., 941 Johnson parkway, St. Paul, has given general contract to William Baumeister Construction Co., for an addition and extensive improvements to its foundry.

* * *

Keystone Brass Works, 926 West Twelfth street, Erie, Pa., has erected an addition 70 x 110 feet, to its plant to take care of the increased volume of business. M. H. Rowley is manager.

* * *

City Pattern Works, 1161 Harper avenue at Rivard street, Detroit, is building an addition which will provide 20,000 square feet of additional floor space. The construction will be completed by the first of the year. Vaughan Reid is president of the organization.

* * *

Perfect Circle Co., Newcastle, Ind., is building an addition to its foundry to cost approximately $175,000, and will consist of one and 2-story wings to the present building.

* * *

Sterling Aluminum Products Inc., 2925 North Market street, St. Louis, is constructing a factory at North Market and Glasgow streets, 81 x 112 feet. Edward J. Lawler, 3736 West Pine boulevard, is architect.

* * *

Mount Vernon Foundry Co., Grand Rapids, Mich., recently has been organized to manufacture aluminum and nonferrous castings. Leonard DeVos, 15 Mt. Vernon N. W., Grand Rapids.

* * *

Tennent Steel Castings Co., Seattle, has been incorporated with $50,000 capital by M. G. Tennent and M. M. Pixley, Seaboard building, to operate a steel castings foundry.

* * *

Brown Industries Inc., Sandusky, O., Oliver Rinderle, president, is adding 6000 square feet of factory space for production of castings for a machine tool and automotive industries.

* * *

American Car & Foundry Co., Berwick, Pa., is building a machine shop addition, 160 x 280 feet, heat treating building 100 x 260 feet, and carburizing building 120 x 135 feet, also a new general office building.

* * *

Cuyahoga Foundry Co., 4530 East Seventy-first street, Cleveland, is building a 1-story foundry building 80 x 116 feet, to cost about $40,000. J. W. Proshek is president.

* * *

Aluminum Co. of America, 2210 Harvard avenue, Cleveland, has purchased 20 acres near its plant and will build two buildings for foundry purposes, 120 x 360 feet and 200 x 440 feet. F. A. Billhardt, company engineer, Pittsburgh, is in charge.

* * *

Plant expansion which will triple its fabricated magnesium output to cope with demands of national defense is being made by the American Magnesium Corp. Most plants of the firm are operating on a 3-shift a day full capacity basis according to Wiser Brown, first

(*Concluded on page 96*)

RAW MATERIAL PRICES
Nov. 18, 1940

Iron	
No. 2 foundry, Valley	$24.50
No. 2 Southern Birmingham	19.00
No. 2 foundry, Chicago	23.00
No. 2 foundry, Buffalo	23.00
Basic, Buffalo	22.00
Basic, Valley	24.50
Malleable, Chicago	23.00
Malleable, Buffalo	23.50
Charcoal iron, furnace	27.00
Coke	
Connellsville beehive premium	$5.00 to $6.50
Wise county beehive coke	5.50 to 6.50
Detroit by-product delivered	11.50
Scrap	
Heavy melting steel, Valley, No. 2	$20.00 to $20.50
Heavy melting steel, Pittsburgh, No. 2	19.50 to 20.00
Heavy melting steel, Chicago, Auto No. 2	16.00 to 16.50
Stove plate, Buffalo	17.00 to 17.50
Stove plate, Chicago	13.00 to 13.50
No. 1 cast, mchy., New York	17.50 to 18.00
No. 1 cast, mchy., Chicago	17.75 to 18.25
No. 1 cast, Pittsburgh	22.00 to 22.50
No. 1 cast, Philadelphia	22.50 to 23.00
No. 1 cast, Birmingham	17.00
Car wheels, iron, Pittsburgh	21.50 to 22.00
Car wheels, iron, Chicago	21.25 to 21.75
Railroad malleable, Chicago	23.75 to 24.25
Malleable, Buffalo	22.50 to 23.00
Nonferrous Metals	**Cents per pound**
Castings copper, refinery	12.12½
Straits tin	50.50
Aluminum, 99 per cent	17.00
Aluminum, No. 12 (Secondary, standard)	15.00 to 15.50
Lead, New York	5.80
Antimony, New York	14.00
Nickel, electro	35.00
Zinc, East St. Louis, Ill	7.25

MACHINE TOOL MANUFACTURERS TURN TO ROTO-CLONE FOR COMPLETE DUST PROTECTION

FIVE ROTO-CLONES EXHAUST CASTING FINISHING OPERATIONS AT MONARCH MACHINE TOOL CO.

Dust conditions created by casting cleaning present a serious problem in machine tool manufacture. Roto-Clones solved this problem for Monarch. Above are two views in their casting cleaning rooms. Dust intake gratings on which castings are worked are connected to Roto-Clone ducts under floor which lead to Roto-Clones housed in a separate building. Please write for complete engineering data on the Roto-Clone and its application to all Foundry dust problems.

ROTO-CLONE
DYNAMIC PRECIPITATOR

AMERICAN AIR FILTER CO., INC.
INCORPORATED
718 Central Ave., Louisville, Ky.

FOR FOUNDRY AAF DUST CONTROL

(*Concluded from page* 94)

vice president and general manager. Others are being placed on that basis as soon as personnel can be trained. The foundry at Cleveland now is producing 350 per cent more than it did in July, a year ago. The new foundry at Buffalo, now in its second month, is geared into high speed production and will have an output exceeding that of the Cleveland plant. The Los Angeles plant is now being expanded to twice its previous capacity, and a new die casting plant has just been erected and equipped at Garwood, N. J.

* * *

Index of sales of foundry equipment during October, according to the Foundry Equipment Manufacturers association, Cleveland, is 264.0 as compared with 161.2 in September.

* * *

Central Pattern & Foundry Co., 3737 South Sacramento avenue, Chicago, is adding a new building which increases its floor space from 75,000 to 105,000 square feet. The expansion program, which will cost approximately $20,000, will increase production 30 per cent.

Obituary

Arthur C. Myers, 36, foundry superintendent, Perfect Circle Co., New Castle, Ind., died of a heart attack at his desk Oct. 9. Mr. Myers had been with the Perfect Circle company for the past 14 years as metallurgist, and in recent years in charge of the foundry. Prior to that he was assistant metallurgist at the Studebaker Corp., South Bend, Ind. Mr. Myers was an active member of the American Foundrymen's association.

* * *

Willard J. Bell, president, Newaygo Engineering Co., Newaygo, Mich., died Oct. 17 in that city.

* * *

J. E. Maher, foundry superintendent, Erie City Iron Works, Erie, Pa., died recently.

* * *

William B. Hosford, 98, retired vice president of the Dodge Mfg. Co., Mishawaka, Ind., died Oct. 27 in that city.

* * *

Fred Klugger, 47, assistant superintendent, Frank Foundries Corp., Moline, Ill., died Nov. 1, following an explosion of an underground tank at the plant. Mr. Klugger had been employed by the Frank corporation for 10 years and was made assistant superintendent a few months ago. He was born May 24, 1893, at Louisville, Ky., and moved to Rock Island at the age of two.

* * *

Wesley J. Carlyle, 71, general manager, Homer Furnace & Foundry Corp., Coldwater, Mich., died Oct. 22 in a Battle Creek hospital.

* * *

Herman Frederick Heyl, 54, superintendent at the Easton, Pa. plant, Taylor-Wharton Iron & Steel Co., died in Easton Oct. 12. Mr. Heyl had been associated with the company since 1906.

* * *

Noble J. Ross, 86, one of the founders of the Beloit Iron Works, Beloit, Wis., in 1885, died at his home in that city after a week's illness. Mr. Ross was active in the business until his retirement in 1925.

* * *

Ernest B. Whitmarsh, 59, factory superintendent, Detroit Brass & Malleable Co., Detroit, died in that city Oct. 28. Mr. Whitmarsh was born in Vanderbilt, Mich., but had resided in Detroit for 40 years.

* * *

A. G. Rapp, 69, of the A. G. J. Rapp Co., Chicago, foundry equipment sales and engineering, died at his home in Evanston, Ill., recently after an illness of several months. Mr. Rapp was born in Sweden in 1871, and after graduating from Boras Technical college, went to Chicago in 1890. He was associated with Link-Belt Co., that city, for 30 years, being the company's foundry engineer for a long period. From 1926 to 1932, he was in charge of the engineering, National Engineering Co., Chicago. Since that time, he had been associated with his son, Stanley R. Rapp, in the sale of foundry equipment. Mr. Rapp was a member of the American Foundrymen's association.

* * *

Robert H. Good, 63, superintendent, Moore Bros. Co., Elizabeth, N. J., died Oct. 13 at Asbury Park, following an illness of several months. Mr. Good had been affiliated with that company for 48 years, first as an apprentice, then successively as a molder, core maker, pattern maker, and, prior to his appointment as superintendent in 1926, foreman of the pattern shop. He was born in Hastings, Ont., and went to Elizabeth with his family at the age of two. At one time his father, uncle and two cousins, as well as himself, were employed by the Moore company. He had long been active in the New Jersey Foundrymen's association and was a member of the American Society of Mechanical Engineers.

Adventures of Bill

(*Concluded from page* 62)

what, in its opinion, are the best interests of the whole business. No section thereof will be overlooked and the importance of none unduly magnified. We ask the co-operation of all those who desire the advancement of foundry interests. We do not propose to be easily satisfied. Constant improvement we are in a position to promise already, until no paper of its kind in this or any other country shall take higher rank.

"That was written nearly 50 years ago, the cocky, ambitious dream of a molder 30 years old. And he lived to see every item of the dream come true.

"Gradually as his horizons widened he organized several associations. After the organization he acted as president or secretary for several years. More prominent among the group may be included American Foundrymen's association, National Founder's association, American Pig Iron association, Malleable Iron Founder's association. In foundry circles he attained great personal prominence while serving as commissioner of the National Founder's association.

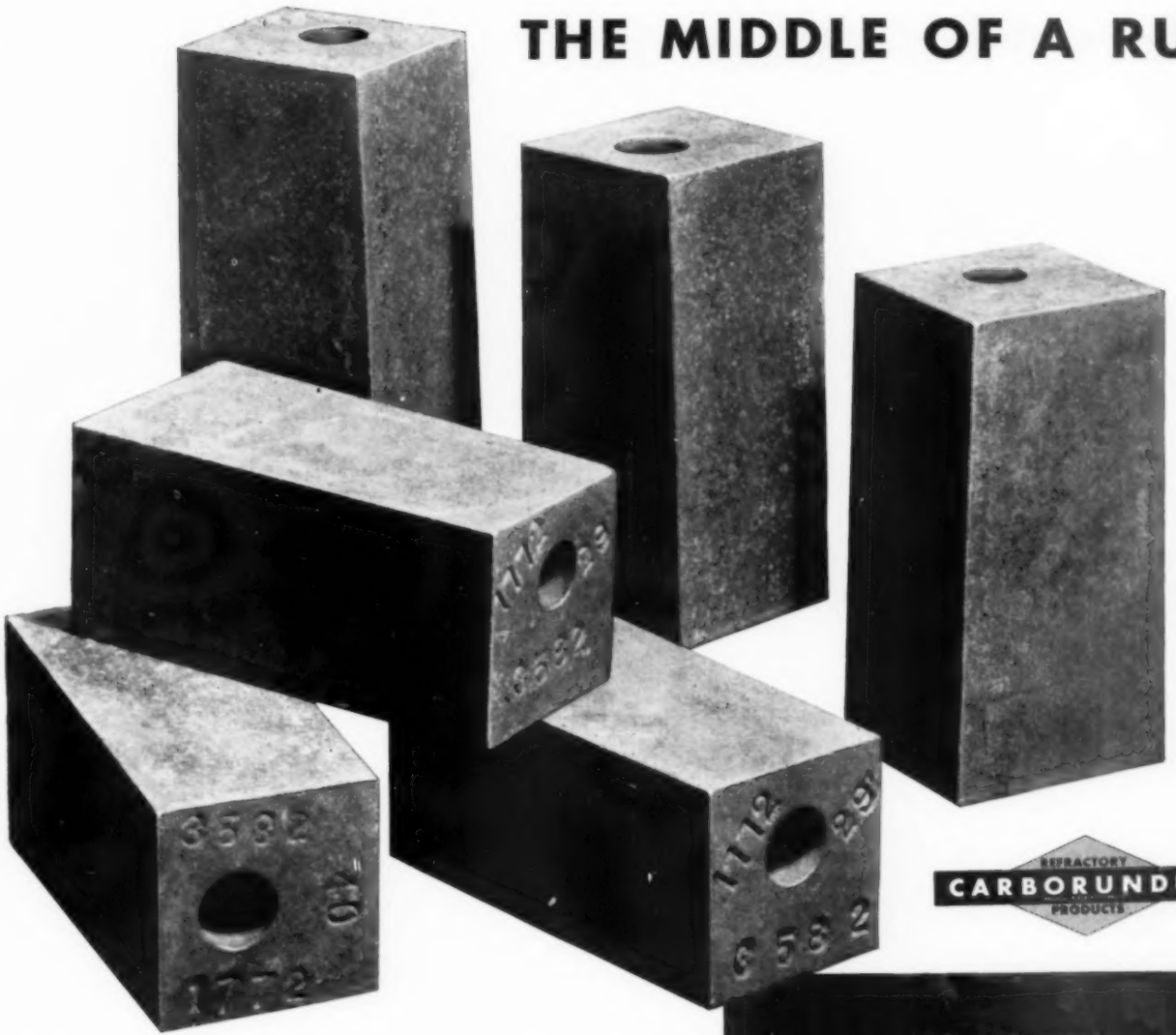
"In the national arena he jousted right handsomely with the venerable Martin Fox, the calm Joe Valentine and the belligerent Mike Keough, successive presidents of the International Molders Union. It is a remarkable and significant tribute to him and to these men that their disputes were not tinged with personal rancor. When Martin Fox died he left his walnut rolltop desk to his one time professional opponent and personal friend John Penton.

"First and last through an exceedingly busy life he was an earnest, consistent and enthusiastic booster of the foundry industry. He died in his Santa Barbara home, Sept. 8. His epitaph well might be that of Stevenson beginning 'Under the wide and starry sky' and ending with 'Here he lies where he longed to be. Home is the sailor, home from the sea and the hunter home from the hill.' "

American Air Filter Not Sold

Negotiations for the purchase of the American Air Filter Co., Louisville, Ky., by the Westinghouse Electric & Mfg. Co., Pittsburgh, as announced on page 97 of the November issue of THE FOUNDRY, have been definitely abandoned by mutual consent of both companies. There will be no change in ownership, management or field representation of the American Air Filter Co., and that company will continue functioning as an entirely independent organization.

What! NO SLAG HOLE FAILURES IN THE MIDDLE OF A RUN?



● That's right—no failures, when you use "Carbofrax" slag hole blocks.

Ten hours, fourteen hours, even eighteen hours of continuous uninterrupted cupola operation is now possible with these super-refractory blocks made from "Carbofrax"—the Carborundum Brand Silicon Carbide Refractory.

No delays—no shutting off the blast—no slowing down—no added labor expense.

"Carbofrax" blocks have extremely high refractoriness. They are produced by a special process that gives a uniformly dense, durable structure so highly resistant to the abrasive action under the high temperature of molten slag that they maintain their hole size longer.

And don't forget that Carborundum also produces "Ferrocarbo" (deoxidizer and graphitizer for grey iron)—crucible and open flame non-ferrous furnace linings—furnace lids—refractory cement—and pyrometer tubes.

THE CARBORUNDUM COMPANY

REG. U. S. PAT. OFF.

Refractory Division · **PERTH AMBOY, N. J.**

District Sales Branches: Chicago, Philadelphia, Detroit, Cleveland, Boston, Pittsburgh. Distributors: McConnell Sales and Engineering Corporation, Birmingham, Ala.; Christy Firebrick Company, St. Louis, Mo.; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Company, Los Angeles, San Francisco, Calif.; Denver Fire Clay Company, El Paso, Texas; Smith-Sharpe Company, Minneapolis, Minn.

(Carborundum, Carbofrax and Ferrocarbo are registered trade-marks of and indicate manufacture by The Carborundum Company)

NEW FOUNDRY DEVOTED TO RESEARCH

(*Continued from page* 49)

obtained, into actual production. For that reason, all facilities in the new research foundry are of a size that would be used in a production plant.

The research foundry is interested, first of all, in the products of the four major divisions of the foundry industry, namely nonferrous, steel, malleable and gray iron castings. Work of the foundry is geared closely to the problems of industry in improving present cast materials and in developing new ones. Whether it be concerned with flame hardening, hot quenching, welding, gall resistance, corrosion resistance, thermal or electrical properties, higher strength, mechanical or abrasive wear resistance, fatigue, torsional strength, creep, machinability, hardness or any one of a wide variety of interests, an effort is made to find a satisfactory answer to the problem in the research laboratory. At the present time a basic investigation on cupola melted cast iron deals with the effect of moisture in the cupola air supply. Equipment used in this work is shown in Fig. 5.

Served by 5-Ton Crane

The main portion of the foundry building is 54 x 145 feet. The main bay is 34 feet wide and is served by a 5-ton crane operated from the floor by a pendant cord, which was supplied by the Shepard-Niles Crane & Hoist Corp., Montour Falls, N. Y. The foundry does not include a core room but necessary cores are obtained from a nearby commercial foundry. Complete facilities for analytical work, metallographic and physical testing and other research investigations are available in the main laboratory building, and therefore are not duplicated in the foundry. Pig iron, scrap iron, scrap steel, etc., are stored in the foundry yard, served by a pillar crane. A separate sheet metal building is used to store the various foundry sands and coke. Goggles, leggings, pyrometers, ferroalloys and other supplies are stored in the laboratory store room.

The foundry building includes wash room, shower, toilet, locker and office facilities. Sand testing equipment for moisture, permeability, and green compression strength are used in the foundry. The equipment employed in the foundry includes a size T, three-phase electric furnace made by the Pittsburgh Lectromelt Furnace Corp., Pittsburgh. The furnace is provided with two interchangeable shells so that one can be lined basic and the other lined acid, or any two like or unlike refractories can be used to make this furnace a more flexible working tool in a research laboratory. The nominal hourly rating of the furnace is 500 pounds but it has a cold charge capacity up to 1000 pounds, depending on the thickness of the lining. The main use of this furnace is for steel melting. This furnace is supplemented by a small single phase electric furnace of 50-pound capacity supplied by the same manufacturer. A third electric furnace is the single phase rocking type furnace of 300-pound capacity made by the Detroit Electric Furnace division of the Kuhlman Electric Co., Bay City, Mich. This furnace is used mainly on cast iron investigations. The transformer room is an adjunct to the main foundry building.

Prevents Temperature Loss

An especially designed oil-fired crucible tilting type furnace was supplied by the Campbell-Hausfeld Co., Harrison, O. The furnace is large enough to handle a No. 120 crucible. The special feature of the installation is an overhead crane which can be used to pick up the shell of the furnace and transport it to the job without removing the crucible or tapping the crucible into a ladle. This expedient eliminates serious loss of metal temperature in handling certain types of metal. Its use is mainly on nonferrous metals but is used occasionally for special types of cast iron.

The foundry also has two high-frequency types of melting furnaces of 17.5 and 20 kilowatt capacity. These furnaces, built by the Ajax Electrothermic Corp., Trenton, N. J., will handle heats up to 30-pound capacity. The same equipment is used for very small furnaces handling heats of 1 or 2 pounds. These furnaces serve a wide field being used for melting low alloy steels, highly alloyed steels, cast iron, ferroalloys and alloys free of iron, etc.

The cupola is a No. 2½ model B, made by the Whiting Corp., Harvey, Ill., and lined to 20 inches inside diameter. The cupola blower is the positive pressure type, made by the Roots-Connersville Blower Corp., Connersville, Ind., and has a 3¾ cubic foot displacement. It is operated by a constant speed 10 horsepower alternating current motor through a variable speed drive made by the Reeves Pulley Co., so that a wide range of air volume is available. The blower is located on the mezzanine floor and is housed in a sheet metal room vented to both the outside atmosphere and an air conditioner. A lithium chloride Kathabar unit made by Surface Combustion Corp., Toledo, O., permits investigation of the effect of moisture on the properties of cupola melted cast iron. Investigations have been underway for some time on both dried air and humidified air in the range of 30 to 250 grains of water per pound of air. Another accessory piece of equipment is a Fahrenwald type of preheater which consists of a series of hair pin tubes with an internal diameter of 1.6 inches. Each unit is designed to handle 100 cubic feet of air per minute and both direct current and counter current air flow principles are incorporated. The assembly consists of 15 units arranged in parallel. The tubes are made of heat resisting steel. The unit is oil fired and its operation is entirely independent of the cupola. It has been operated with air temperatures as high as 1000 degrees Fahr. but is designed for temperatures in the neighborhood of 1250 degrees Fahr. The various units on the cupola air supply are so interconnected that operation may be attained with room temperature air, with conditioned air, with preheated air, or with any combination desired.

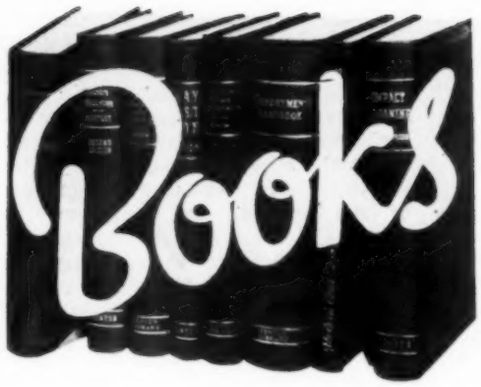
Castings Are Not Sold

Cupola heats generally run 2 hours, melting a total of 3000 pounds of metal. All heats are supervised by members of the laboratory staff. Several skilled craftsmen including molders, cupola tender, etc., are employed full time in the foundry. Products of the foundry are not sold. Although it occasionally makes castings for specific applications, the normal product is a test piece suitable for one of the numerous tests involved in developing foundry products. The facilities of the foundry are not limited to castings for the melting facilities also serve to produce ingots for investigations of interest to the producer of wrought materials.

The foundry is not geared up for high production. Practically all molding is done by hand but standard arbitration bar molds are made on a jolt machine. Pig, scrap, sand, and coke are brought into the foundry in wheelbarrows. Materials for the cupola charge are raised from the foundry floor level to the charging floor level with a monorail hoist. It is impossible to operate all of the melting equipment or even a major portion of it at any one time as there is neither labor, floor space or crane facilities available in sufficient quantity.

In the accompanying illustrations Fig. 1 shows pouring an electric furnace heat in the foundry. Fig. 2 is one corner of the sand testing laboratory. Fig. 3 depicts the equipment for preheating the cupola blast. Fig. 4 shows the tapping of the cupola. Accurate recording of temperature is made on each tap by the man at the left with an optical pyrometer. Temperature reading again is taken when the metal is poured from ladle into mold.

(*Concluded on page* 100)



Christmas Gifts

FOR PRACTICAL FOUNDRYMEN

■ Practical foundry books can add more to the income of modern foundrymen than any operator can afford to give as a Christmas gift . . . and the increased earnings derived from improved workmanship will last throughout a lifetime.

Give your employees and foundrymen friends books this year . . . books from the Penton Bookshelf . . . books that are recognized for their practical value throughout the foundry industry.

As an inducement to order early, all books ordered for Christmas giving will be appropriately gift wrapped in gay Christmas wrappings. Please be sure to mark the coupon "Gift Wrapped", if you wish this done.

TALES FROM THE GANGWAY

450 pages, 59 chapters, $1 postpaid. This book is a collection of the early chapters of Pat Dwyer's rollicking foundrymen, told in an exceedingly readable style. As practical as it is readable, this book tells the foundryman many practical things, including; the making of gears, open sand plates, sheave wheels, large pots, blast furnace coolers, winding or hoist drums, patterns, stand pipe connections, long columns; coremaking, etc. Originally sold for $3, this book is filled from cover to cover with down-to-earth, practical suggestions. If there is a foundryman who does not already have this book he is missing one of the most readable and usable books ever written.

ELEMENTARY FOUNDRY TECHNOLOGY

Second Edition, 377 pages, 132 illustrations, $3 postpaid. This book is an excellent book of instruction for apprentices, young men studying the foundry trade and for reference use of practical foundrymen. Included, in addition to elementary chemical and physical data, are discussions of; effects of elements on iron; iron manufacture; elementary problems in steel foundry production; brass melting, foundry sands, molding machines; and gates and risers.

MODERN BLAST CLEANING AND VENTILATION

213 pages, 38 illustrations, $4 postpaid. This book, by C. A. Reams, engineer of Ford Motor Co., brings latest and most approved methods of casting cleaning to foundrymen in plain language. It is full of completely practical suggestions and proved methods and practices. Application of cleaning methods discussed will eliminate many objectionable cleaning room practices. Full information on abrasive selection and use is included. Practical foundrymen report this book worth many times its cost.

GRAY CAST IRON

383 pages, completely illustrated, $5 postpaid. John W. Bolton, recognized foundry authority has collected and compiled in readable form all recent information on this subject, so presented that it is extremely usable. Includes latest information on structural metallurgy; engineering and physical properties, melting processes; casting defects; effects of regular and alloying elements; superheating; heat treatment; machinability and wear; effect of temperature on mechanical properties; corrosion, and specifications. This book is a "must" in every progressive gray iron foundry.

FOUNDRYMEN'S HANDBOOK

310 pages, fully illustrated, $3 postpaid. This book, reduced from $6 because some specifications are now out of date, has long been a standard reference book among foundrymen. It is a complete compendium and handbook covering every branch of foundry work from estimating the price to cleaning finished castings. If you do not already own a copy of "Foundrymen's Handbook" your working tools are incomplete.

IMPACT CLEANING

480 pages, 256 illustrations, $7 postpaid. Wm. A. Rosenberger is a recognized impact-cleaning engineer who has gathered together all important information on the subject and presented it in readily understood form. Every foundryman knows that cleaning costs can eat up profits. This book shows both theoretical and practical ways to reduce cleaning costs to a minimum. It presents the "how and why" of high cleaning costs and shows exactly the methods to be used in their reduction. No foundryman responsible for either quality production or satisfactory earnings should be without this book.

GATES AND RISERS FOR CASTINGS

373 pages, fully illustrated, $3 postpaid. This is a practical book covering completely and with authority a subject never before covered in book form. It is an encyclopedia of sound foundry practice supplying reliable answers to the ever present question, "How can casting defects be prevented?" Written for every foundryman from workman to owner.

For convenience in ordering, use the coupon below . . . be sure to check all the books you want.

REFINING METALS ELECTRICALLY

414 pages, 55 illustrations and 50 tables, $2 postpaid. This book, reduced from $6, covers the theory and practice of melting in the electric furnace. Gives helpful data on size selection, type to use, economy in operation, advantages and limitations, installation, maintenance, etc. A fully practical book in which history and background are presented to provide the reader with all data necessary in installation, operation and maintenance.

MELTING IRON IN THE CUPOLA

240 pages, 126 illustrations, $2 postpaid. This book formerly sold for $5. Covers practically every phase of cupola construction, operation and maintenance. A thoroughly practical book. Suitable for the novice studying the cupola as well as the practical foundryman who operates it. Tables, formulas and a complete cross-index listing more than one thousand items makes this a valuable reference and practical work book.

THE FOUNDRY, Book Department,
1213 W. Third St., Cleveland, Ohio

Enclosed is $.....* ☐Check; ☐Money Order; ☐ Company Order; for the following books I have checked.

- ☐ **"Elementary Foundry Technology," @ $3 postpaid**
- ☐ **"Gates and Risers for Castings," @ $3 postpaid**
- ☐ **"Gray Cast Iron," @ $5 postpaid**
- ☐ **"Modern Blast Cleaning and Ventilation," @ $4 postpaid**
- ☐ **"Impact Cleaning," @ $7 postpaid**
- ☐ **"Foundrymen's Handbook," @ $3 postpaid**
- ☐ **"Melting Iron in the Cupola," @ $2 postpaid**
- ☐ **"Refining Metals Electrically," @ $2 postpaid**
- ☐ **"Tales from the Gangway," @ $1 postpaid**

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*Orders for delivery in Ohio must be accompanied by 3% additional to cover compulsory state sales tax.

(*Concluded from page 98*)

The apparatus for dehumidifying the cupola blast is shown in Fig. 5, and at the right may be seen the control panel for the cupola operation. Fig. 6 shows the 30-pound capacity high-frequency induction type furnace. The operator is shown taking a temperature determination prior to pouring. Looking down at the foundry section is depicted in Fig. 7. Pouring is facilitated by a small ladle swung from a mobile overhead crane. Tall vertical molds are for arbitration test bars which are poured from each heat. Pig and sand casting molds also are shown. In the background are electric furnace, sand box and sand muller for conditioning molding sand. Fig. 8 is a general view taken from the opposite end from Fig. 7.

Booklet Available

Founders of aluminum alloy castings will be interested in a new 90-page booklet just published by the Aluminum Co. of America, Gulf building, Pittsburgh, on "Aluminum Casting Alloys and Alloys for Other Purposes." It is divided into six sections devoted to various phases including choice of materials, aluminum ingot products, general foundry principles, descriptions of alloys, and an appendix of tabular data on physical properties, nominal compositions, etc. The booklet is an outstanding example of the printing art and contains numerous illustrations. Covers are cellophane bonded to paper giving a glossy soil-proof finish, and a coil-spring binding permits the pages to lie flat when opened.

Book Review

The Story of Superfinish, by Arthur M. Swigert Jr., cloth, 672 pages, 6 x 9 inches, published by Lynn Publishing Co., Detroit, for $5.

The author of this work is director of production research for the Chrysler Sales division, Chrysler Corp., Detroit, and his book is a notable contribution to the literature of machined surfaces.

David A. Wallace, president, Chrysler Sales division, conceived the necessity of some such process as superfinishing and was in active charge of the work leading to its development as a commercial success. Mr. Wallace says of the book: "The story contained in this book is of vital importance to all who are interested in industrial progress. It is of particular interest to the scientist, physicist, engineer, metallurgist, foreman, toolmaker and mechanic."

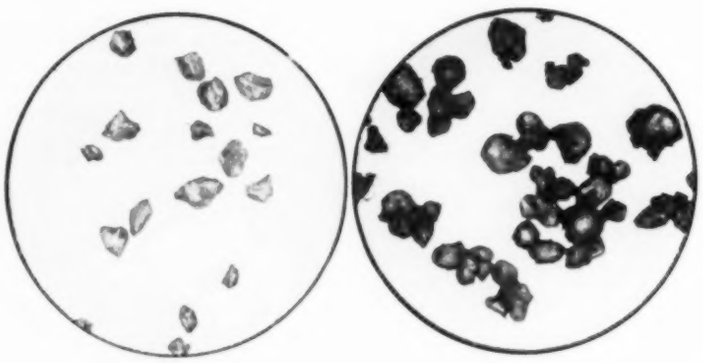
Text of 300,000 words is accompanied by 720 photographic illustrations and diagrams, each fully described in its own caption. While the subject matter is a technical description in understandable language of the whole progress of surface finishing, it deals principally with the industrial development of metal surface finishing in the last three decades.

Publishes Bulletin

American Foundrymen's association, 222 West Adams street, Chicago, just has made available preprint No. 40-30 on "Job Evaluation and Time Study in the Foundry." It contains 27 pages and comprises a transcript of the panel discussion on those subjects which was held during the 1940 annual convention of the association. Copies of the bulletin are available to members for 50 cents each, and $1 to nonmembers.

Bakelite Corp., and the Halowax Corp., recently moved from 247 Park avenue to the Carbide and Carbon Building, 30 East 42nd street, New York.

The
MICROSCOPE
TELLS THE STORY



BEFORE AFTER

These cuts of actual photomicrographs show how the CLEARFIELD Mixer spreads the bond over the sand grains and causes them to stick together in the mold.

The CLEARFIELD gives you STRONG sand with MINIMUM bond and moisture additions.

You know what that means: better castings and fewer casting losses.

May we send our catalog?

CLEARFIELD MACHINE CO.
Clearfield, Pennsylvania

STARTING BOYS ON ROAD TO FOREMANSHIP

(*Continued from page* 47)

ter adjustment can be made in respect to a course better fitted to their qualifications. Beginning with the new semester a guidance program now is in effect.

Material sent to mold into future foundrymen in many respects was above the average. Young men through force of financial circumstances at home were compelled to forego any thought of higher education and in its place substitute a vocation they thought might fit their needs. After two years of intensive training in molding and general foundry operations, 22 out of the original group of 25 have graduated. Three dropped out. One through physical disability, one through indifference and one through change of residence.

At the first meeting each member of the group was presented with a questionnaire covering information about himself and his home environment. Adequate guidance can be given only when the most important facts are known. Items in the questionnaire included various phases of school work, family history, home conditions, general outside associations, health and general outlook on life. In addition to the questionnaire, further data were secured through regular school agencies.

Students Earn High Grades

Results showed that in all but five instances the students came from homes in the thickly congested districts. Thirteen fathers were on relief and none of these fathers had any special vocational training. In nearly all cases the families were large. Home conditions were unfavorable for home study. Despite these handicaps, their first grades of the boys in shop work and related subjects averaged *excellent* for the group. Of the 23 graduates seven are eligible for the National Honor society.

Trade tests were given to help determine whether the individual had the general qualities and characteristics for a chosen occupation following proper training. Tests were based on the assumption that certain innate capacities underlie and condition ability and skill. Where these capacities are present, success is likely to result from training. Where they do not exist, failure is inevitable. Trade tests given before and after the training period revealed difference in aptitude between members of the group. The training program, based upon the results of the tests was designed to make mechanics and to discover the boys possessed with the latent possibilities of leadership.

The training program was laid out as follows:

A—Learning To Know the Student Personally

1. It is highly important to learn student personalities.
2. Use every opportunity to meet students out of class hours and in their own activities.
3. Arrangement should be made for personal conference on all problems.

B—Subject Matter To Be Taught

1. Organization of subjects is the most important factor in good teaching experience.
2. Experience and knowledge of subject are two essentials in working problems.
3. Plants are visited to keep abreast of the times.
4. A detailed outline of the course, presenting every daily work operation for the semester is given each student in advance.
5. Complete job and operation instruction sheets for each operation are given to the student.
6. Estimate of the fundamentals and approximate time necessary for mastery is made before the assignment.
7. Progress is adapted to the

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for Large Cores and Molds

Coleman Car-Type Mold Oven with gas-fired recirculating heating system, National Supply Co., Toledo, O.

Wherever heavy cores and dry sand molds are handled—

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Coleman Oven Engineers have been designing and building this class of equipment for over thirty-five years—they can meet any core and mold baking requirement regardless of size.

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BUILDERS OF COLEMAN AND SWARTWOUT OVENS
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CORE AND MOLD OVENS

average student mentality.
8. The lesson plan should be well in mind and as free from texts as possible.

C—Handling Class Room Instruction

1. Have outline for discussion.
2. Encourage students to ask questions and to answer each other's questions during discussion period.

D—Stimulating Students To Think

1. Ask questions that cannot be answered without thought.
2. Urge students to ask themselves *why?*
3. Urge students to forget grades and marks. Convince them that the subject is worth thinking about.
4. Set up live problems for student consideration.
5. Try any legitimate method to set their minds working.
6. Hard boiled attitude on teacher's part inhibits successful thinking on student's part.

E—Securing Interest

1. Present the subject with enthusiasm and in a logical manner.
2. Manifest keen interest in the subject.
3. Maintain class room discipline.
4. Show the practical value of the subject. Be a good salesman of the subject.
5. Establish personal contact with each student and have students treat each other in a similar manner.
6. Make assignments that will stimulate a desire to follow up.

F—Testing and Marking

1. Use notebooks and laboratory work as a basis.
2. Grade upon responsibility achievement.
3. Grade upon interest and originality involved.
4. Grade upon hand work skill.
5. Base marks largely on personal opinion and upon work accomplished daily.

G—Securing Consistent Work

1. Hold private conferences with backward students. If the class as a whole is lagging, look for faults in instruction.
2. Have the students engage in contests of skill. Give worth while prizes. Prizes can be solicited from various industrial interests.
3. Work consistently, maintain interest, apply constant and steady pressure, vary the methods, make requirements clear and definite, but not too burdensome.

H—Stimulating the Student To Use the Material

1. Work out problems connected with the student's future vocational plans.
2. Place a student in charge of fellow students.
3. Set problems of sufficient difficulty to involve reflective thinking.
4. Where proper inspiration is given with information, authentic, practical and worth while, the student will make use of the information as opportunity arises.

I—Inspire Students To Desire Knowledge of a Subject Rather Than Mere Credit and High Marks

1. Keep knowledge of the subject uppermost so that this value will assume first place.
2. Encourage outside reading. Attend outside industrial conferences, visit plants. Bring in outside speakers to educate and inspire students.
3. Place real problems before students and keep them there.
4. Challenge students to enter into a common study of the problem, so that all may come out with knowledge and power. Grades and credits will take care of themselves.

J—Training in Personal and Social Effectiveness

1. Example is a great factor in developing these qualities.
2. Develop characteristic traits that lead to success.

K—Training in Hand Work Skill

1. Skill cannot be taught. It

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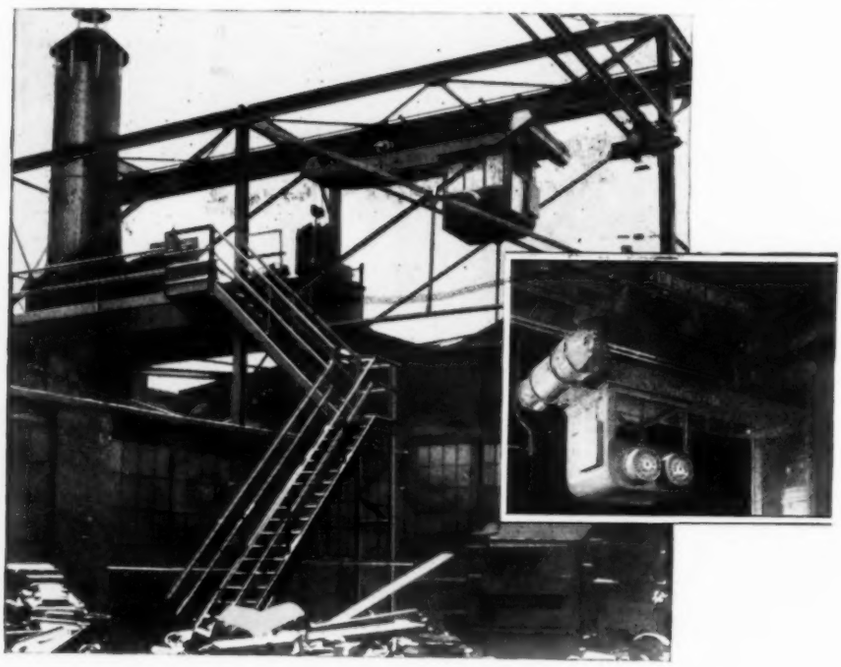
AT LESS COST PER TON
... with SHEPARD-NILES
CUPOLA CHARGING HOISTS



● Each charge is lowered in place, not dropped. Uniformly layered charges insure more even distribution of heat. Expensive charging floors are eliminated. Cupolas are charged faster and with fewer men—LESS cost per ton.

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must be developed.
2. Skill can be acquired only by constant repetition.
3. Responsibility can be acquired only by giving responsibility to the student.

Where the students have been interested enough to finish 2 years of intensive shop and class room training as a beginning of their apprenticeship in foreman training, where they understand what has been set before them, there should be no necessity to worry about the future of the foundry industry. Thirst for knowledge regarding more advanced understanding of the vital elements will be satisfied only when the student has reached a full understanding of the industry.

In the past, young men have entered the foundry industry fully equipped with a knowledge of everything, except the knowledge required for this particular industry. They were woefully lacking in the technique of co-operating and working with other people. We are attempting to prepare our young men for a better approach to industrial problems. Neither time nor effort has been spared in stressing the importance of factors related to the problem.

Prepare for Later Problems

Boys are taught the rudiments of social science, human wants, production, capital and labor, business units, profit and loss and the economic functions of government. In the class room emphasis has been placed upon public speaking. Every effort is made to throw them into contact with problems of human relationship. Government organization has been drilled into them through study of civics. Attempt has been made to unfold progressively and by constant repetition the many problems to be encountered after they leave school.

Foremanship is a profession. In recent years only desirable types of men have been hired to fill the various positions. In practically all cases the man who does the hiring is specially trained in psychology and kindred sciences. He uses great care and demands definite ability before giving out the job.

The new man is placed under a foreman who as a rule knows very little about the science of human relationships, the problem of handling men. He has to deal with the age old problem of production. With the additional item of human relationship placed on his burden, he has to know what to do and when to do it. His responsibility has become greater than ever before.

A man no longer can be elevated to this position solely on his merits as an excellent mechanic. In addition to his mechanical ability he must have a knowledge of the science relating to the human being. Upon these premises it seems logical to assume that the manufacturer should begin training future foremen in the days of their youth. It may mean a long drawn out process, but will be profitable in the end.

Conclusions never are more reliable than the data on which they are based. For the 22 students referred to previously and grading as *A* for exceptional, *B* for average, *C* for fair, *D* for unfit, the result of the survey shows that ten students received an *A* grade, three were in the *B* class, two in the *C* class and seven in the *D* class. Nine students in the *C* and *D* classes are proficient in foundry handicraft, but lack the qualities necessary to lead others.

Employers Digest

Wage and hour division of the department of labor has published a 40-hour edition of the "Employers' Digest" presenting information concerning the wage and hour law and especially pertaining to the change in the standard work week to 40 hours. The digest may be secured from any field office or from the wage and hour division in Washington.

Eliminate the Bottleneck

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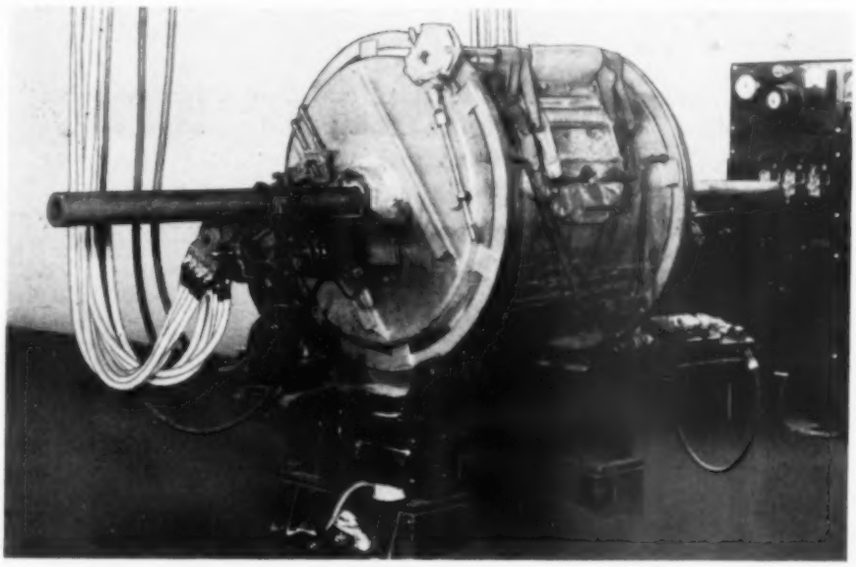


DETROIT ELECTRIC FURNACE DIVISION

KUHLMAN ELECTRIC COMPANY • BAY CITY MICHIGAN

CASTINGS RESIST CORROSION

(*Continued from page 42*)

the short mold conveyors in front of each machine to any one of the four long conveyors. A similar transfer car at the opposite end of the long conveyors carries the poured molds to the shakeout station where the sand is dumped and the castings are removed to the cleaning department. The empty flasks are taken back and transferred to a long roller conveyor close to the wall and returned to the molding stations.

The second half of this bay is devoted to the production of a wide variety of small castings on a battery of six pairs of squeezer machines located close to the wall where each pair is served by an overhead sand bin. The entire floor in front of the machines is occupied by raised roller conveyor lines on which the molds are carried in constant succession to the outer end where they are filled with molten metal. A monorail system in a long loop over the outer end of the conveyor units carries the ladles of metal, while an industrial track on the floor carries the sand and castings to the shakeout station. Metal is supplied at properly calculated intervals to prevent congestion on the roller conveyors serving the battery of molding machines. Each of the roller conveyors is approximately 35 feet in length, and has a capacity ranging from 20 to 30 molds. A sand laboratory at the end of the building is equipped with all the necessary apparatus for maintaining close and accurate control of the sand.

Construction and layout of the alloy steel foundry, 100 x 300 feet, differ to some extent from the same features in the first building. The main structure, steel, brick and glass under a peaked roof, is 70 feet in width and 30 feet from floor to roof girders. The crane runway along one side is mounted on the building columns, while on the opposite side it is carried on an independent set of columns erected 10 feet from the wall and providing a height of 20 feet under the crane hook. This arrangement provides an open floor space practically from one end of the building to the other, and from a wide gangway at one side to the crane columns on the opposite side. An additional bay 30 feet in width, 14 feet 6 inches to the roof girders is covered by a slanting roof and extends the full length of the building on the side facing the first foundry building.

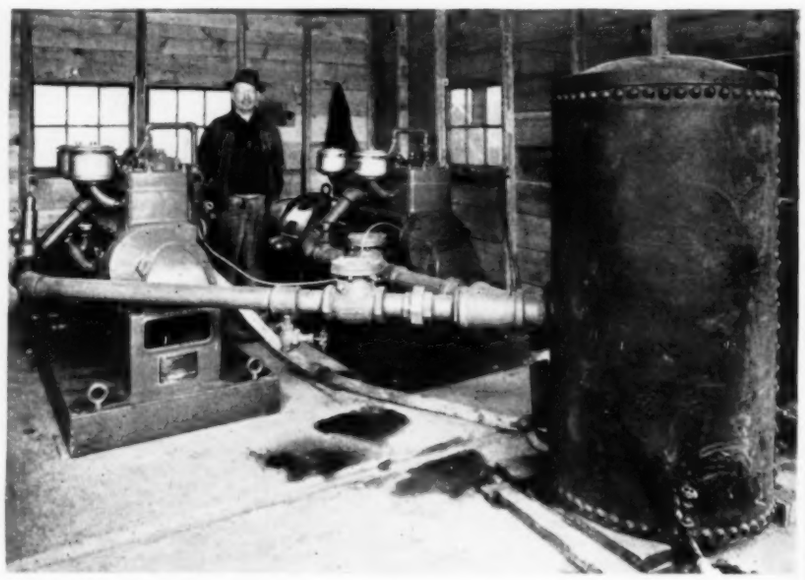
Castings Cleaned on Conveyor

Commencing at the east end of this bay and taking the various items in succession, this bay houses the electric furnace transformer room, laboratory, ovens for drying the centrifugal molds and a cleaning room equipped with an oval roller conveyor approximately 100 feet in length on which the castings move successively through the shears, swing grinders, and pressure blast room. On the journey the castings are gaged, inspected, tested and where necessary, are set up on a surface table for check measurement. Pressure blast room and auxiliary equipment were supplied by the Pangborn Corp., Hagerstown, Md. An extensive exhaust system piped to the various pieces of equipment carries all dust and foreign material to a receiver outside the end of the building. The entire layout and assembly constitutes an exceptionally clean and efficient department.

Metal in the alloy foundry is melted in two electric furnaces, 500 and 2000 pounds capacity per charge, made by the Swindell-Dressler Corp., Pittsburgh, and located at one side of the main bay near the east end of the building. Metal from each furnace is tapped into a large ladle and carried by over-

SCHRAMM

AIR COMPRESSORS



● Battery of SCHRAMM "Utility" Direct Motor Drive Compressors. On the left a 600 cu. ft. compressor with 100 H.P. motor. On the right a 450 cu. ft. compressor with 75 H.P. motor. Note the small size, compare with the man in charge, total floor space, exclusive of air tank, 7½ ft. x 9 ft.

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head crane to any designated point on the floor where it is poured directly into large molds or distributed by hand shanks among the smaller molds set out on the floor in the usual manner. The centrifugal casting machines, which through thickness of lining may be adapted to the production of castings of various diameters, are located close to the furnaces and are served by a wall crane. This crane also handles the molds entering and leaving the drying ovens in the immediate vicinity.

Sand is prepared in a muller made by the Beardsley & Piper Co., Chicago, and located approximately in the center on the opposite side of the foundry from the furnaces. Backing sand is conditioned in a revolving pan and roller type mill. New sand from a Pennsylvania source and in two degrees of fineness is mixed in varying proportions for the facing sand. For example on small castings made on squeezer machines a 30 to 70 per cent proportion of the two sands bonded with 3 per cent bentonite and 0.75 per cent cereal binder shows a fineness of 55; 2.7 to 3.2 per cent moisture, 75 to 80 flowability, green strength 5 to 5.5 pounds and permeability 175 to 200. For heavy castings and particularly in pockets and corners the refractoriness of the sand is increased by the addition of silica flour. With occasional exceptions the castings fall into three classifications, light, medium weight and heavy. Maximum weight for the light castings molded on squeezer machines is approximately 20 pounds; medium weight made on rollover machines is 80 pounds; and on the floor up to 2500 pounds.

Steel in Two Divisions

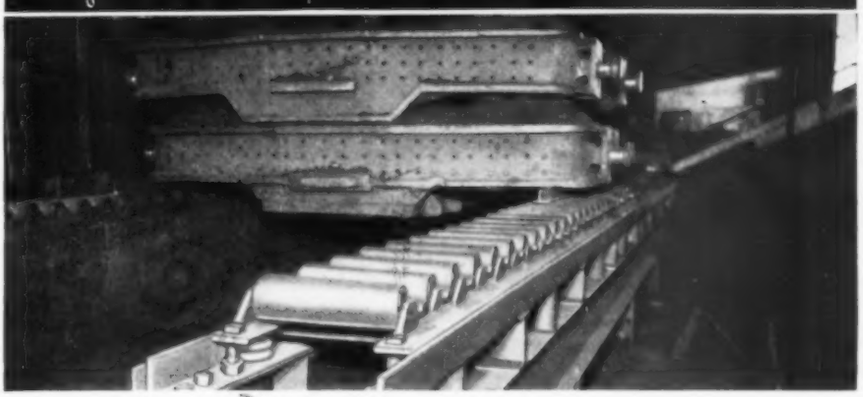
In the alloy casting industry, stainless or heat and corrosion resisting alloys are classified into two divisions; one covering the alloys for service temperatures below 1200 degrees and the other for temperatures above 1200 degrees Fahr. At times this classification has been confusing since many so called heat resisting alloys are subjected to corrosive influence at elevated temperatures. In the heat resisting group these classifications are considered each with its own particular field of application. These alloys also are essentially of the austenitic type in which the element chromium predominates and ranges from 1¼ to 3 times the nickel content.

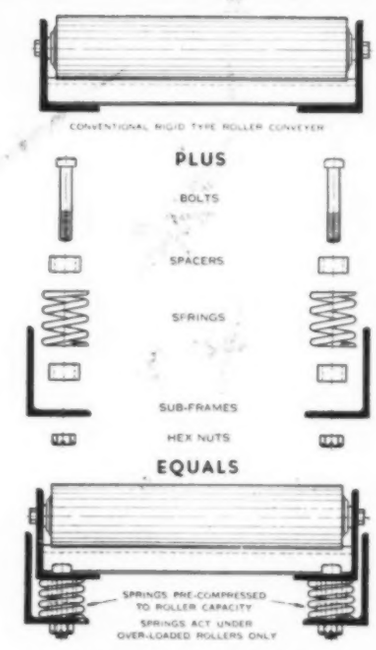
Careful and intelligent designing is of economic importance to the user because it saves in weight and lengthens service life. The high coefficients of expansion coupled with low thermal conductivity increases the possibility of internal shrinkage. Following design points should be considered: Uniform sections, proper weight distribution, rounded sections with generous sections for repeated heating, staggered ribs at hot spot intersections, small cored holes at intersections, elimination of extra metal.

The 18-8 alloys have by far the widest field of application. They are supplied in three grades according to type of service. These alloys, although austenitic, are not stable since a partial change in the austenite takes place when heated near 1200 degrees Fahr. The treatment results in a loss in the corrosion resistance of the alloy due to the precipitation of carbide at the grain boundaries. Considerable research work has been carried out in an attempt to overcome this failing in the 18-8 type alloy. Some good can be accomplished by proper balance of chromium, nickel and carbon or by the addition of some element that holds the carbon in solution. The elements columbium, titanium and tantalum have been used, but columbium has been the most favorably received. Columbium is preferred over titanium in products that must be welded since much of the latter is lost through rapid oxidation at welding temperatures.

Various service conditions have resulted in modification of the 18-8 analysis by addition of other ele-

MATHEWS SPRING MOUNTED CONVEYERS





SPRING MOUNTED CONVEYER

CUT MAINTENANCE COSTS

THE principle is simple; the roller axles are rigidly locked in the frame as in the conventional "rigid type" construction, but the conveyer frame which retains the rollers is carried on pre-compressed coil springs. The springs are held in compression equal to the rated safe load of each roller. Under impact conditions or excessive loads the springs absorb the overload.

This construction represents the greatest improvement in roller conveyer in many years. Its application will reduce maintenance costs by prolonging the life of the equipment. When conditions are severe, "spring mounted" is the practical conveyer construction for the job.

Capacities from 150 lbs. to 8000 lbs. per roller available.

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CONTINUOUS FLOW PRINCIPLE OF HANDLING MATERIALS

ments. Molybdenum, the most outstanding of these, is added in amounts of 2 to 4 per cent to prevent pinholes or pit corrosion. It increases resistance to sulphite, sulphuric acid and acid attack in general.

Castings of the 18-8 analysis must be given a satisfactory solution heat treatment to bring out full corrosion resistance. Thin section castings can be heat treated by water quenching from 2050 degrees Fahr. Thick-section castings should be air cooled from a temperature of 1850 to 1950 degrees Fahr. to prevent intergranular cracking.

Eighteen per cent chromium alloy is supplied in the nonhardenable grade with carbon less than 0.15 per cent, or hardenable with a minimum of 0.35 carbon. It has wide application in the nitric acid industry and possesses greater resistance to atmospheric corrosion, vegetable and fruit juices, mild acids and alkali than the 13 per cent chromium alloy. The hardenable 18 per cent alloy is useful where abrasion as well as corrosion is encountered. Hardness in excess of 500 brinell may be obtained with carbon over 0.60 per cent.

Dating back to the beginning of the stainless steel industry, the 13 per cent chromium alloy still has many useful applications. It is resistant to fresh water, moist atmosphere, hot oils, fruit and vegetable juices and a variety of mild acids and alkalies. Its nongalling properties make it a satisfactory alloy for valve seats and disks as well as other parts of valves. It can be hardened to approximately 400 brinell by suitable heat treatment and is more resistant in the hardened condition.

Recent research in the 24 per cent chromium, 12 per cent nickel alloy, either with or without molybdenum, has shown its superiority over the lower chromium-nickel alloys. It is resistant to nitric and nitric sulphuric acid mixtures. The 24-12 alloy with molybdenum is exceptionally resistant to sulphite liquors encountered in the paper pulp industry. Due to the higher alloy content and its stability at elevated temperatures, it is especially suitable for applications in corrosive media where the temperature is above 1000 degrees Fahr. or in the range where carbide precipitation will seriously affect the corrosion resistance of the 18-8 alloy.

The 29 per cent chromium, 9 per cent nickel alloy has been used extensively in equipment for the sulphite paper pulp industry, the active corrodent being sulphurous and sulphuric acids. Where the 29-9 alloy has shown signs of failure, alloys containing molybdenum have been used successfully and so may be desirable.

Consider Many Factors

In sulphite pulping, the cooking liquor by oxidation contains free sulphuric acid, while in sulphate pulping the active corrodent is caustic soda and sodium sulphide. In the former, alloys such as 29-9 or 24-12 have proved satisfactory with or without molybdenum. In the latter, 18-8 and 18-8 with molybdenum have served well.

In the construction of equipment for the chemical industry, it is often necessary to consider mechanical strength and machinability as well as resistance to corrosion. Service life of equipment is influenced by temperature, concentration, amount of impurities, velocity or agitation and galvanic action. These many influences make it practically impossible to predict the service life of alloys from laboratory tests.

Whenever possible, plant tests of the alloys found most suitable in laboratory tests should be made. This will enable the manufacturer to determine the most suitable alloy before any costly investment in equipment has been made.

The chemical industry in all its branches provides the largest market for corrosion resistant alloys.

Castings of 18-8 with 0.12 or 0.07 per cent maximum carbon, with or without molybdenum, are used for

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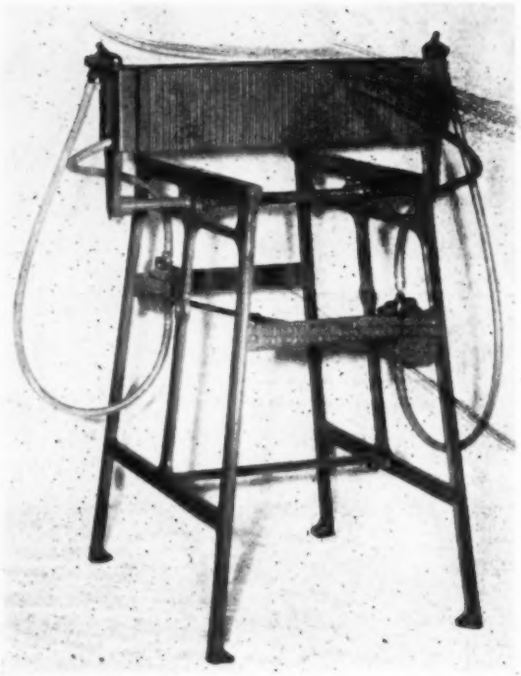

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pumps, valves, fittings, agitating and mixing equipment in the food industry to prevent contamination or discoloration and as a protection against bacterial growth. Manufacturers of catsup, mayonnaise and vinegar have simplified their processes of manufacture because of the merits of these alloys in withstanding attacks of acetic, lactic, citric and tartanic acids.

The rayon industry offers a large market for corrosion resistant alloys, principally 18-8, in a variety of special equipment. Applications extend from the manufacture of raw materials to the final finishing of rayon in the form of cloth. Some special equipment is made in the higher nickel-chromium alloys, but 18-8 is used for conveying, mixing and agitating chemicals in both dry and liquid state.

This is the concluding article dealing with the plants operated at Lima and Springfield, O., by the Ohio Steel Foundry Co. Grateful acknowledgement is made D. W. Talbott, assistant foundry superintendent and L. E. Welch, metallurgist Fahrite division, for technical data, etc., on heat and corrosion resistant alloy steels. The first appeared in the November issue.

THE EDITORS

Discuss Production Of Steel Castings

Cleveland Chapter of the American Society for Metals held its "Foundrymen's Night" meeting on Nov. 4. Previous to the meeting a large number of members and guests participated in an inspection trip through the West Steel Casting Co.

Main speaker was C. W. Briggs, technical advisor, Steel Founder's Society of America, Cleveland, who discussed "Metallurgical Developments in the Production of Steel Castings." He stated that the developments paralleled those for wrought steels, and that at present about 75 alloy compositions regularly are in production with 15 additional special compositions being used from time to time. Steels for flame hardening, carburizing, nitriding, etc. also are produced by the foundry.

To maintain the high quality of steel castings the industry constantly is studying various production phases such as melting, fluidity, molding, etc., and Mr. Briggs briefly described some of the results obtained through those investigations. Blowholes are eliminated by close control of melting to insure a vigorous boil, reduction of iron oxide, and proper deoxidation. Progressive solidification is essential for solid castings, and by attention to molding methods including gating and risering, partial and total reversal, etc. that condition may be attained.

Due to the numerous factors involved in producing satisfactory steel castings Mr. Briggs stressed the importance of design in accomplishing the best results, stating that they only were achieved by close co-operation between designer and foundryman. The speaker concluded his talk with presentation of an interesting, new sound film, "Design of Steel Castings" which explains known and tested principles of steel castings design in a simple and clear manner.

Federal Foundry & Supply Co., 4600 East Seventy-first street, Cleveland, is building two additions to its plant for storage purposes.

Ferroalloy Output

Production of ferroalloys in blast furnaces and electric furnaces, as reported by 36 establishments covered in the 1939 census of manufacturers, amounted to 783,615 gross tons. This is divided into 412,612 tons of ferromanganese and spiegeleisen; 293,631 tons of ferrosilicon; and 77,372 tons of ferrophosphorus and other ferroalloys, including ferrochrome, ferromolybdenum; ferrotitanium, ferrotungsten, ferrovanadium, etc.

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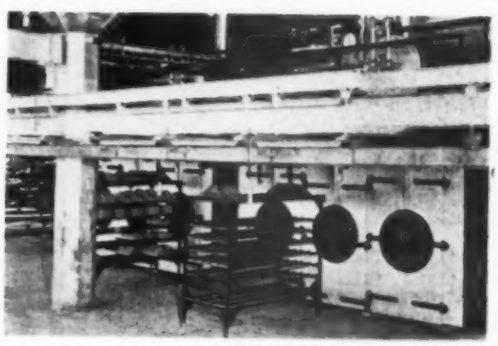
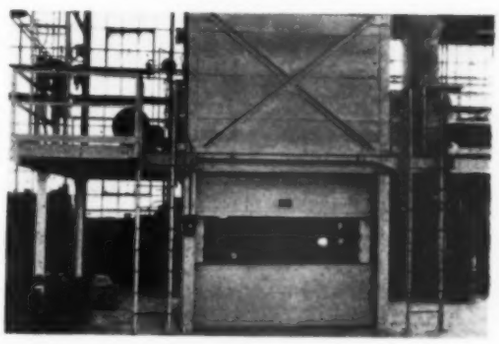


Rack Type Core Ovens



Vertical Core Oven

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CARL-MAYER

OVER 20 YEARS' EXPERIENCE! Mold Ovens

GATING CASTINGS IS IMPORTANT

(*Continued from page* 39)

the final setting occurs at the center. In this way it is simply a question of keeping the center open by additions of hot metal to be sure that there is a core within the riser that may supply fluid metal from which the casting may be fed.

To attempt to pour the casting through the riser undoubtedly must increase the chances of making bad castings if the riser size is adequate to feed the casting, since it is almost always true that the riser must be much in excess of the size of the proper sprue through which to lead the metal into the mold quietly and with a minimum amount of damaging effect to the mold surface. Consequently, better practice is to provide a small sprue through which the metal is led to a gate and through the gate to the mold cavity and also to provide a riser, than it is to attempt to make the mold with a riser only and pour through the riser to fill the mold.

Obviously, very simple shapes can be produced by pouring through the riser without the use of gates and sprues as well, but the chances of making a high percentage of A-1 quality castings are reduced materially by such practice. Many of the best castings are made by pouring through the right size sprue and thereafter through a gate leading into the base of the riser. In that manner the casting is poured through the riser but by way of a sprue which controls the flow and entrance of the metal into the mold cavity so as to insure nonturbulence and to avoid mixing any air or other gases present in the mold cavity with the metal.

Frequent practice in this method includes a horn gate, as illustrated in sketches *A*, *B*, *C*, and *D* in Fig. 7, leading from the sprue to the riser. Sketch *B* shows the horn gate in the usual position and *A* the horn gate reversed so as to avoid the nozzle effect of the large amount of metal rushing down the sprue squirting up through the small end of the horn. However, the nozzle effect is controlled easily in the gating, as illustrated in *B*, if the gate connection between the sprue and horn gate is of a size to restrict the flow to only that amount of metal which will flow quietly through the small end of the horn gate.

Gate Made in Core

Diagram *C* shows an ordinary horn gate in which the sprue leads directly into the gate. That arrangement is not recommended since any dirt or scum is carried directly into the mold. Diagram *D* depicts a horn gate made in a core which has numerous advantages.

It is advisable in laying out such gating to watch the pouring of the first mold by peering down the riser and thereby making sure that the size of gates, sprues, etc. are such as to retard the flow to a quiet influx of metal into the base of the riser.

One of the advantages of this type of gating is the fact that the last metal poured into the mold is that which finally fills the riser. Consequently, the riser temperature is higher than the metal temperature in the mold proper, which means that the riser will be molten after the metal in the mold cavity has set. That in turn insures liquid metal in the riser for feeding the casting during the entire time of setting. One disadvantage to this type of gating is that riser must be connected with the heavy section of the casting to provide feeding as the heavy section solidifies.

The heavy section may be at the top or at the bottom of the mold. If it happens that the riser is con-

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nected with the top of the casting, then as the riser fills from this type of gating, the metal spills over the edge into the lower part of the mold and may form dross because of the agitation of this spilling-over process. Therefore, it is imperative to use this method of gating only when that danger is not present.

A modification of this type of gating, illustrated in Fig. 8, has the horn gate lead into the casting and also through a further connecting gate leading to the base of the riser. By this method the metal first fills up to the level of the casting base and then flows through the additional gate into the base of the riser as well as into the casting. As soon as the casting is filled, the riser continues to fill up with the last and the hottest metal to enter the mold. Consequently, the procedure provides the riser with an excess of temperature over that in the casting, thereby insuring its being molten during the entire time the casting is setting.

Provide Cup at Riser Base

Wherever risers are attached to castings, the base of the riser should be well cupped and the surface of this cup properly rammed and slicked so that there is no tendency of the metal to wash loose sand into the casting. The cup at the base of the riser serves to entrap the first metal entering the riser from the gate, which may be somewhat contaminated by loose sand, or it may be entangled by some of the dross first carried down into the mold as the pouring operation was started.

Where two or more risers are attached to the same casting, care should be taken to see that they are of adequate size to remain molten long after the casting is set and of adequate height to provide the necessary static pressure to force the metal from the riser into the casting. If one of the risers is too small, or is allowed to become too cold and sets before the casting, it means that the other riser must feed the casting by itself. Since the first riser to set may be diametrically across the casting from the other, it would necessitate the available riser feeding clear through the casting.

That obviously would be impossible and, consequently, a shrinkage cavity would be expected at the base of the riser which was insufficient in size or in temperature. Such shrinkage cavities cause by the setting of one riser ahead of another frequently may be corrected by the omission of one of the risers and the increasing of the size of another, thereby permitting one riser to do the work of two. That is particularly true if the one riser is located so it can function for two smaller risers.

Some foundrymen do not understand the importance of the height of a riser. They think that if a riser contains 200 pounds of metal there is 200 pounds of pressure forcing the metal into the mold. However, 200 pounds in a riser of no material height has relatively small static head, but a high riser has a static head proportional to its height. Every inch increase in height means an inch increase in static head. The diameter of the riser must be adequate to avoid setting before the casting, and therefore, must be such as to contain an ample amount of metal, but the height of the riser is what produces the force with which the metal is driven down to the feeding point.

Providing gates and risers is one of the most important steps in the production of uniform quality castings. Sometimes a few good castings may be produced by a gate that has been planned improperly and therefore, the foundryman concludes that the gate is well designed. Furthermore, it frequently happens that a well designed gate for one particular type of metal or one particular alloy of metal is not a well designed gate for another.

For example, the high shrinkage

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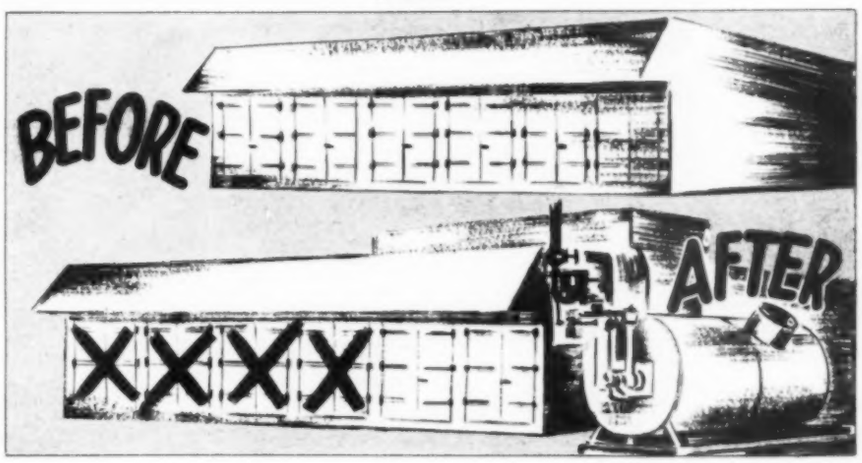

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alloys, manganese bronze, aluminum bronze, etc., must have adequate risers fed properly and the temperature properly maintained. Red brasses and bronzes, even though they are not known as high shrinkage alloys, do definitely shrink as they solidify and their structures develop as they cool. As these crystalline structures develop they require some feeding. Consequently, in spite of the generally accepted theory that red brass and bronze alloys are not high shrinkage alloys and do not need to be fed, in reality they do need to have the right size riser properly located to obtain the best results and uniform high quality castings.

That is particularly true in the case of some of the bearing bronzes in which tin is present above 6 or 7 per cent, or where nickel is included or where both nickel and tin in substantial quantities are present. Without adequate risers to provide the necessary feeding, small shrinkage cavities may be present. Some of these may not be visible to the naked eye at first, but if the castings are well machined and the surface is polished, or tooled so as to avoid smearing of the metal in the machining process, tiny microscopical shrink cavities will be visible. The only cure for these is adequate feeding.

If these tiny cavities connect with one another, they automatically provide opportunities for leaking where the castings are to be subjected to hydrostatic pressure, or where leakage is an important factor. The only cure for the cavities is proper feeding by adequate risers located at the proper points. Even when the castings are to be used simply as ornaments and a high finish is all that is needed, adequate feeding is important to avoid tiny microscopical pin holes that give so much trouble in polishing.

It is not always necessary to have the riser come clear through the top of the mold. Sometimes it is inconvenient to do that. A shrink ball, or in other words, a ball of metal attached at the right point where it can be sawed off or cut off from the casting and yet, during the cooling of the casting, is available to supply the necessary feeding, will be found to serve the purpose of a riser of the usual design. However, with the use of shrink balls, it is well to remember that the ball must be big enough to remain molten while the casting is setting. Also the connection between the shrink ball and the casting must be such that there is no danger of this connection setting before feeding is completed. Otherwise the shrink ball may prove to be a detriment, inasmuch as it might set first and make the casting feed the so-called shrink ball.

Use Pop Gates

There are some castings which permit pouring by what is known as pop gating. Metal is poured through a series of gates at the top of the mold and drops through these gates directly into the mold cavity. When the mold cavity is full, the series of gates become the riser. They usually are a series of gates connected to a large pouring basin. The basin is kept full of metal so that the bottom of the bath of metal is the only metal to enter the mold. The surface upon which the scum floats is thereby entrapped above these gates, as shown in Fig. 9.

There are many who believe that pop gating is successful for certain types of castings, particularly in some special alloys that lend themselves to the particular practice. The practice has a tendency to produce agitation or turbulence of the molten metal in the mold and is likely to cause the production of dross or scum. However, it has been found surprisingly effective in producing some castings of a straight cylindrical design where the drop from the top of the casting would be a conglomeration of small solidified particles somewhat adhering to

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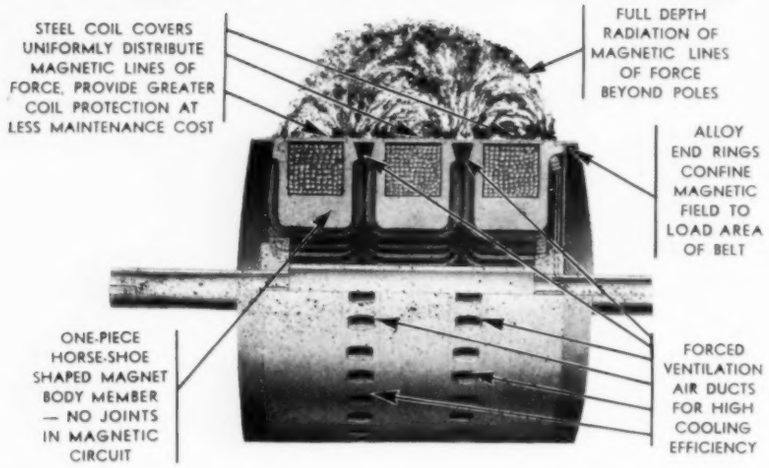
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one another by reason of their semi-molten condition when they landed in the mold. Obviously, they must be molten when they meet one another as they flow into the mold in order to reunite so as to make a continuous and complete casting. Therefore, the practice of making cylinders by this pop gate method is limited and also offers some hazards that must be studied carefully to insure the production of uniformly good castings.

One of the advantages of this practice is that as the mold cavity fills, the hottest metal is always at the top and consequently, when the mold finally is filled, the bottom of the casting draws the next hotter metal above it, and so on until the top is fed from metal in the pouring basin through the series of gates previously described. Thus feeding of the casting is well provided. If perchance the design of the casting is such that at some point well below the top of the casting there is a heavy section, obviously that heavy section will give trouble. That results from not being fed properly in the progressive feeding from the bottom to the top as described. Such a heavy section needs a type of gating that will provide the right kind of risers located to insure feeding of the heavy section and also insure the feeding of the casting itself at the last point to solidify.

The best method by this pop gating process is to provide plugs at the base of these gates, to be removed when the basin from which these gates are supplied with their metal has been filled, thus making sure that only the clear, clean metal at the bottom of the basin passes through these gates to the mold cavity. Of course, the basin must be refilled continuously during the entire time it is being drawn so as to hold the level of the metal in the basin at the point that will avoid any sucking of the surface scum down into the casting.

CHRISTMAS SEALS

Help to Protect Your Home from Tuberculosis

This is the second of a series of articles on the gating of nonferrous alloys. The first appeared in THE FOUNDRY for November and the third will appear in an early issue.—THE EDITORS.

Win Prizes

Foundry displays received special recognition at the fifth annual Manufacturers' Products exhibit, sponsored by the Purchasing Agents' Association of Baltimore, at the Lord Baltimore hotel, Oct. 22-24. First prize for most informative exhibit was presented to the James J. Lacy Co., producer of iron, nonferrous and alloy castings, and the second prize among the local companies for the most decorative booth went to the Gibson & Kirk Co., nonferrous foundry and local distributor of general purpose bearings and machined bars and bearings for the Johnson Bronze Co., New Castle, Pa. For winning its prize, the Lacy company presented practical demonstrations of molding procedure.

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PATTERNS DEMAND BEST

(*Continued from page* 37)

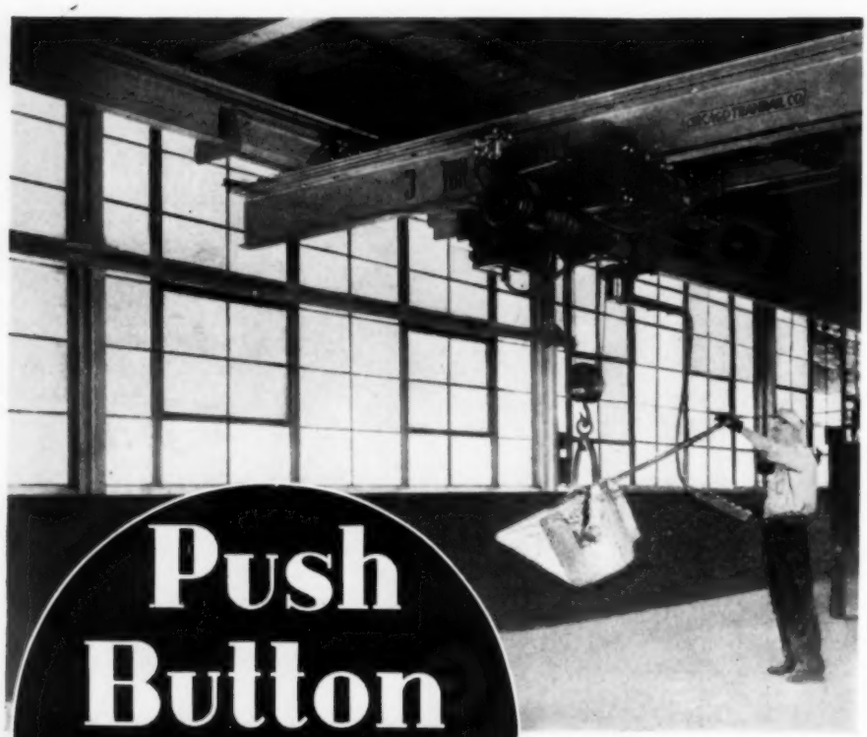
much time is lost by having the patternmakers travel long distances from their benches to the machines. Considerable money can be saved if more care is used in the proper placing of the various machines. The pattern shop that is used for storage purposes as much as for the making of patterns also is familiar. If some patternmakers were taught to be better housekeepers around their benches there would be more accuracy in the making of the patterns themselves. However, it is quite hard to teach a patternmaker cleanliness when the shop itself is permitted to remain disorderly.

Great care should be taken in the selection of materials to be used in both the wood and metal pattern jobs. Lumber should be of the best grade obtainable and never should be used until it has had time to be acclimated properly in the shop. This means that lumber should be kept inside of the shop where it is to be used for at least a month. A longer period still would be better. The climatic change from a cold storage to a warm atmosphere invariably changes the character of the lumber. A well ventilated, even tempered pattern shop means a great deal to the lumber pile. The author has known pattern shops where the moisture content was so ridiculously low that it was even detrimental to the health of the patternmakers. Undoubtedly, patterns built under those conditions will swell and buckle when put to use in the foundry. Many times the lumber dealers are blamed for the behavior of lumber when the worst condition prevails right in the pattern shop. Give the lumber pile a chance and many anxious moments will be avoided. At the same time a financial saving will be provided.

Select Lumber With Care

Care should be exercised in the selection of lumber for pattern work. For master pattern work, we use a Northern cork white pine. We find that this lumber, when properly selected and carefully seasoned, holds the accurate dimensions which are required for master patterns. It also holds its shape over a long period and can take a reasonable amount of foundry handling. Patternmakers like to use white pine for a very definite reason. Wood patternmaking is an art and the patternmaker chooses high grade white pine for the same reason any other artist finds results more satisfactory when he is working with his chosen medium. The patternmaker likes this wood because it is cut to dimension easily, thus enabling him to make better time on the job. For master pattern work, the pine is not heavy enough to make large patterns difficult to handle. If that lumber is selected properly, the swelling or shrinking will be almost negligible. Usefulness of a pattern depends upon its ability to stay in shape and the previously mentioned pine, properly seasoned, will do that in an excellent manner. This wood has wonderful gluing qualities. It will absorb glue and permit the building of large and complicated patterns. It also can be nailed without splitting. If the metal pattern casting must have a smooth finish where it will not be machined, then the white pine should be used where possible for master patterns.

Of course, if the master pattern is to be used from time to time and stored in the vault most of the time, Mexican or Peruvian mahogany should be used where possible. We have found that maple, although used in some places, is an unsatisfactory material for making pat-



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terns. No matter how well maple is selected and dried, it still has a great affinity for the moisture in the foundry. We have seen patterns made of well selected maple and with joints that were well glued, draw apart, due to the powerful action of the foundry atmosphere on that lumber.

We have found that flake hide glue is the best for the purpose. It often happens that 5 cents worth of glue holds together $50 worth of labor. Therefore, it is the best policy to buy only high grade, satisfactory glue. However, the patternmaker always should remember that the best of glue will start deteriorating after it has been in solution 48 hours. Therefore, the glue pot should be cleaned every day and fresh glue provided. This factor alone will pay you big dividends. Never permit the glue to get to a temperature over 160 degrees Fahr., as temperatures beyond that point will break down the finest fibered glue. Electric glue pots on the market today control the temperature thermostatically so that there is no excuse for supplying the men with glue that is not properly suited to a real pattern job.

Keep Shellac Pot Closed

Shellac is another very important commodity in the pattern shop and has caused foundrymen considerable grief, especially through the months of June to September. During that period the humidity is unusually high. If shellac pots are left open any length of time, especially during those months, alcohol, having a great affinity for moisture, will take up sufficient moisture to retard or eliminate entirely the drying of the shellac on the patterns. Shellac pots always should be kept clean and properly covered. We use an orange flake shellac, Grade A, which is free from resin and is not bleached with arsenic as are all light colored shellacs. We use No. 5 formula of methanol for cutting. Oxalic acid used in connection with shellac is bad practice. It makes the shellac rather sticky and also retards the shellac drying on the patterns.

Gray cast iron is used chiefly in building production metal patterns. As all foundrymen know, there are many kinds of gray cast iron so experiments have been made to find an iron that can be easily machined, is free from hard spots, and also one that will keep its shape after being machined completely. We use the following analysis: Silicon 2.00 to 2.10 per cent; manganese 0.55 to 0.65 per cent; total carbon 3.40 to 3.50 per cent; phosphorus 0.25 to 0.30 per cent; sulphur 0.07 to 0.08 per cent. These castings brinell from 180 to 190 before being annealed and after annealing the brinell runs from 160 to 165.

All must realize that it would be folly to spend a great deal of money machining castings to close dimensions without first having them annealed properly so that all the strain is removed. Therefore, the iron castings are placed in a cold oven and brought up slowly to from 1300 to 1350 degrees Fahr., depending upon the section to be annealed. The castings are allowed to soak from 1 to three hours and then allowed to cool down slowly with the furnace until they can be handled easily on either machine or bench.

This analysis and annealing operation provides a casting that develops little warping after the pattern is completed.

This article is the first of two from a paper presented at the 1940 New England Foundry Conference. The second installment will appear in an early issue.
THE EDITORS

Policyholders Service bureau, Metropolitan Life Insurance Co., 1 Madison avenue, New York, recently has published a new report entitled, "Business Organization." The publication gives information on certain general principles and patterns of organization structure which can be applied to individual circumstances.

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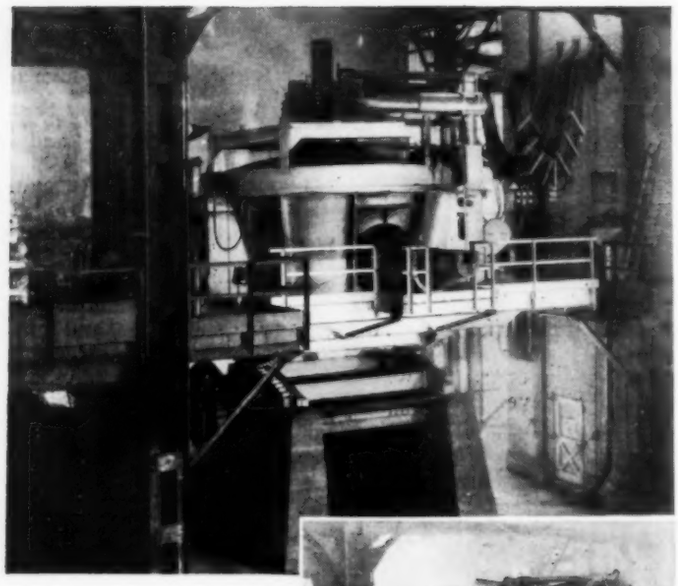

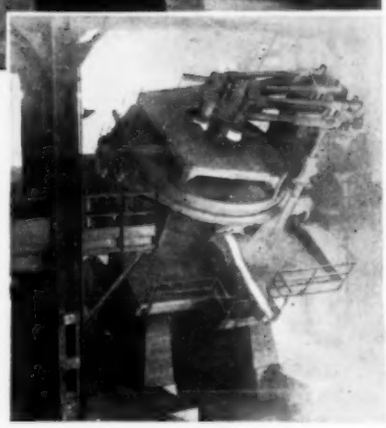

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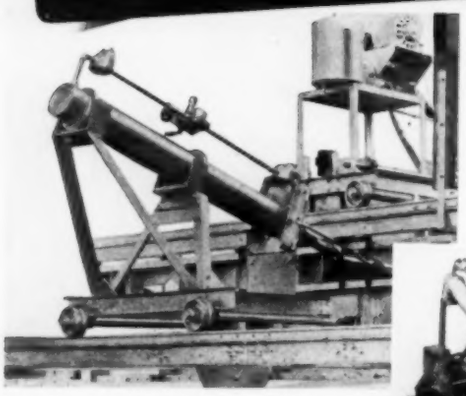

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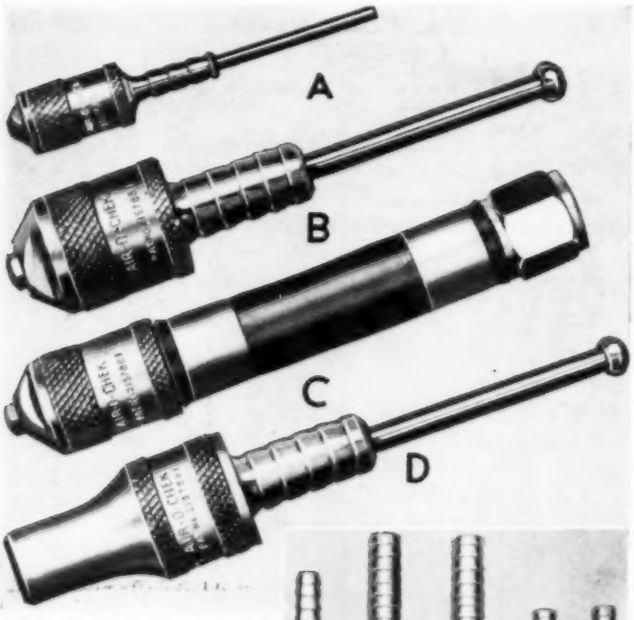

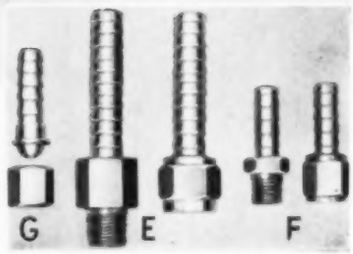

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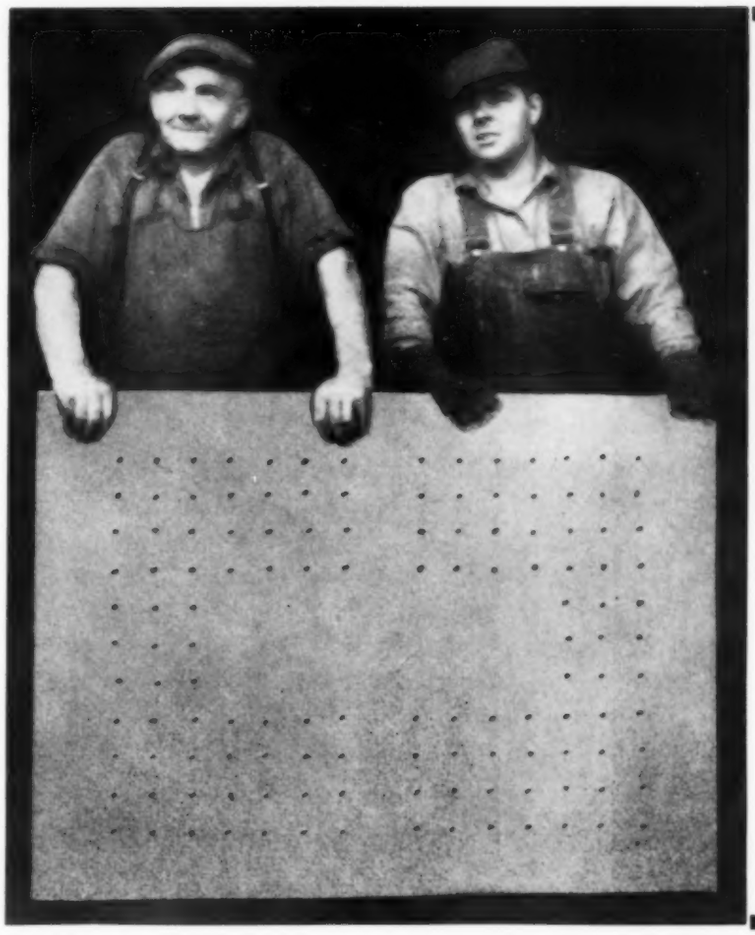

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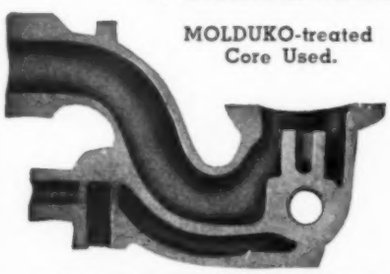

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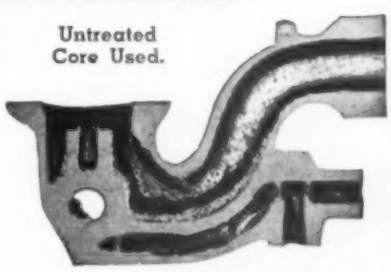

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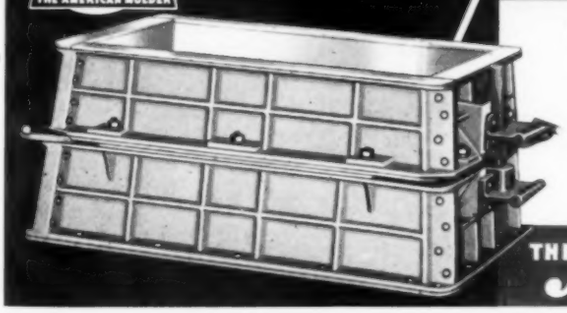

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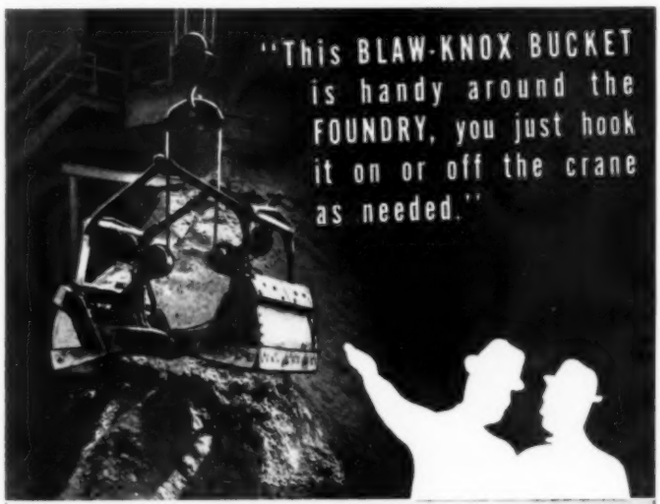

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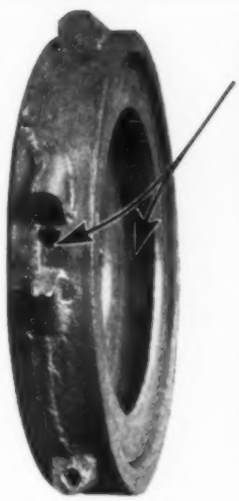

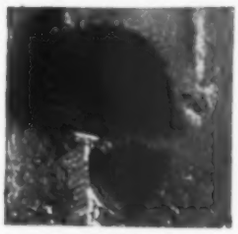

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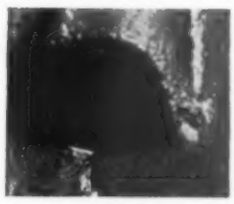

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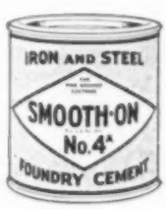

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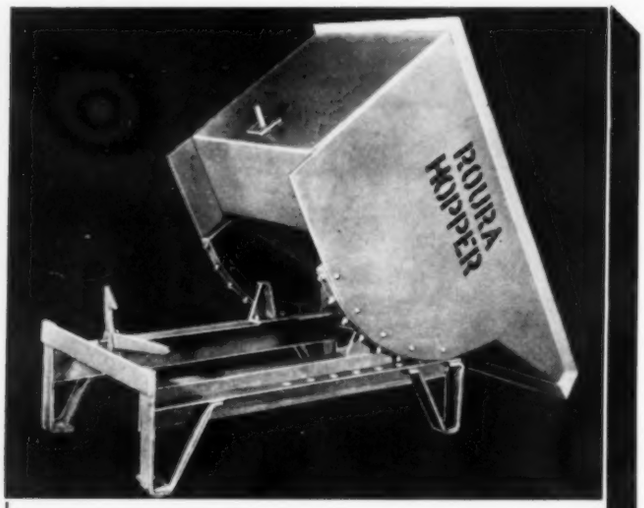

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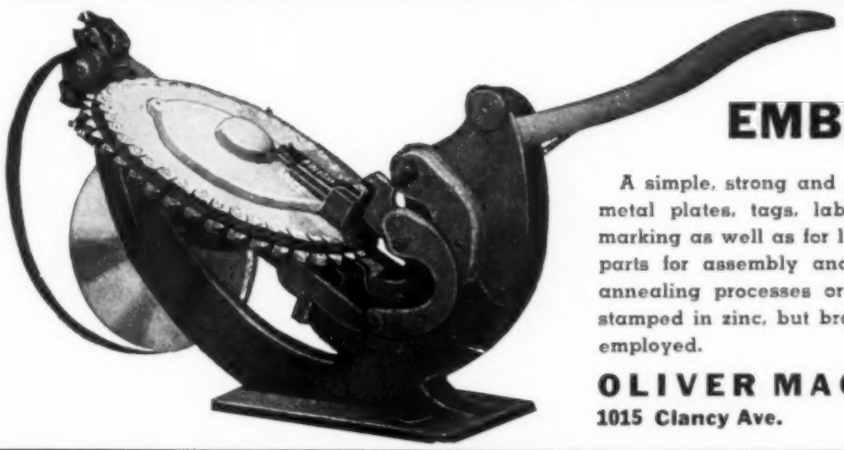

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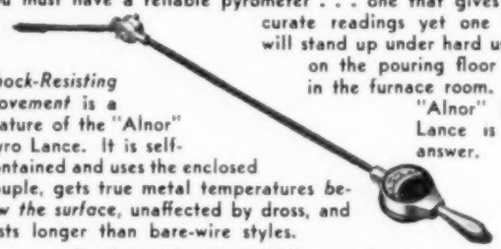

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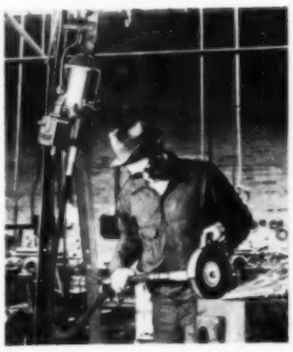

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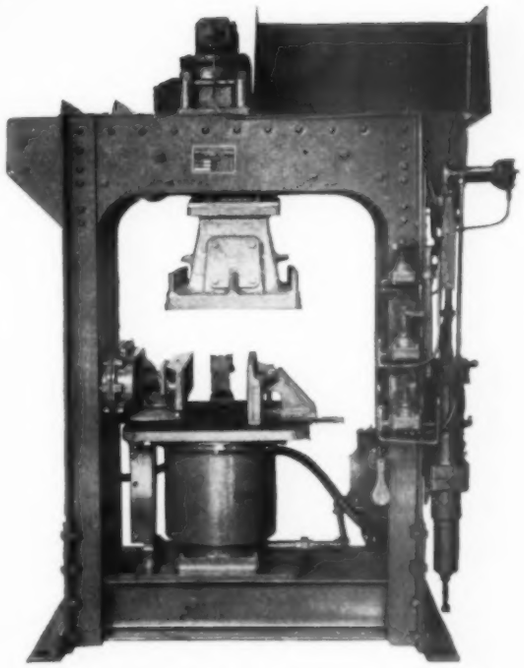

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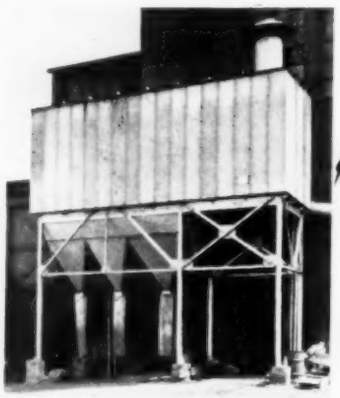

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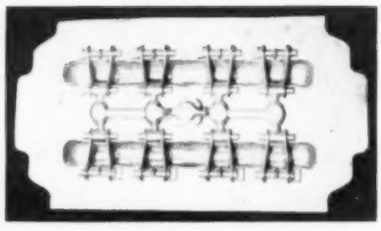

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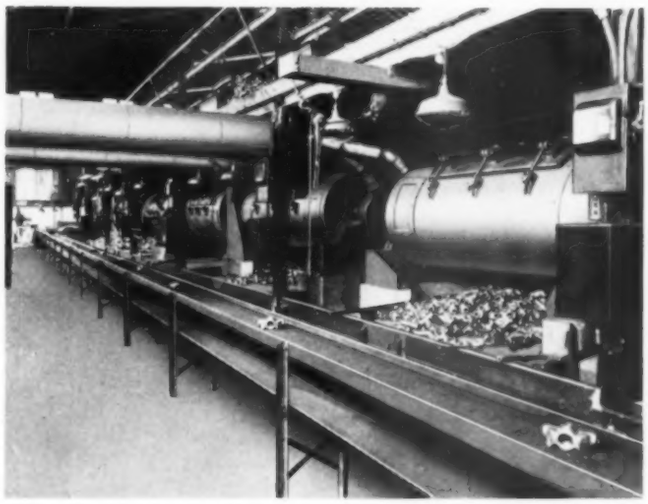

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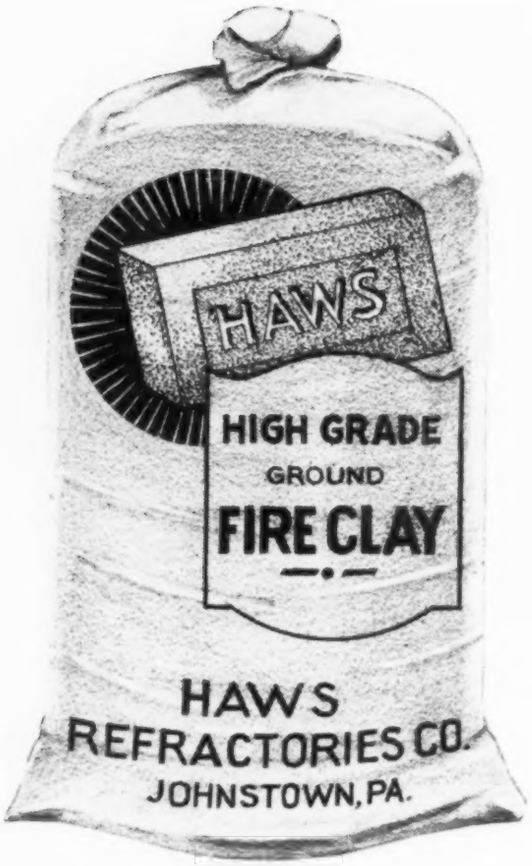

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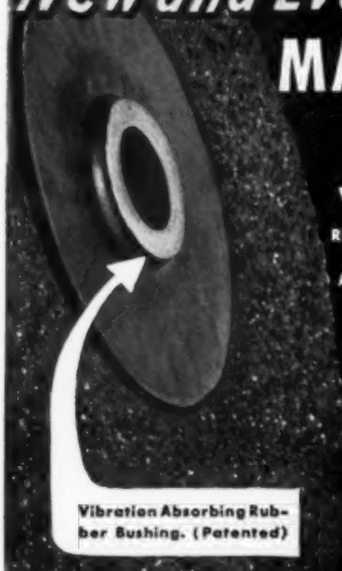

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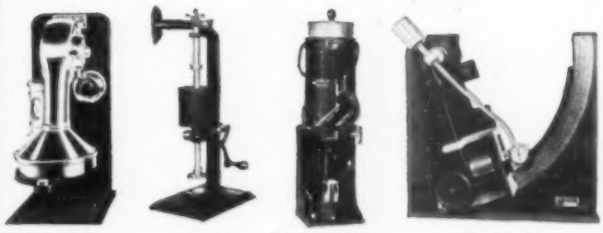

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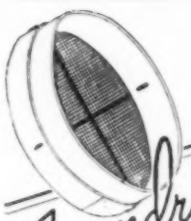

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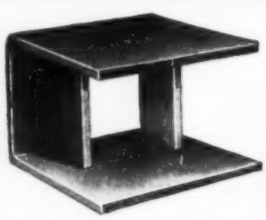

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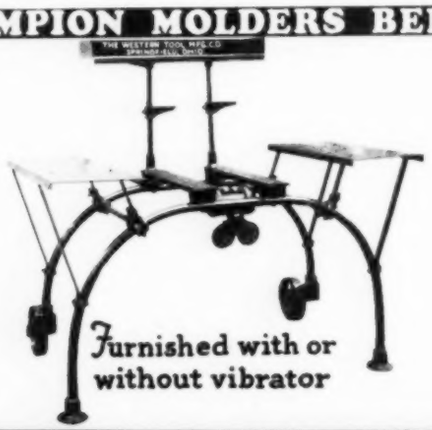

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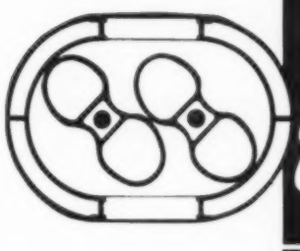

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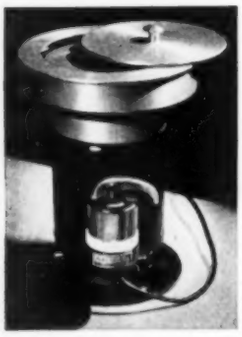

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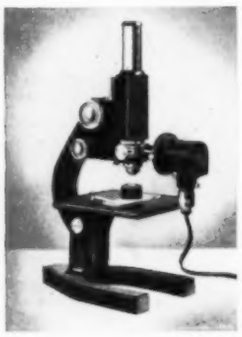

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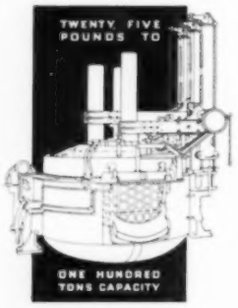

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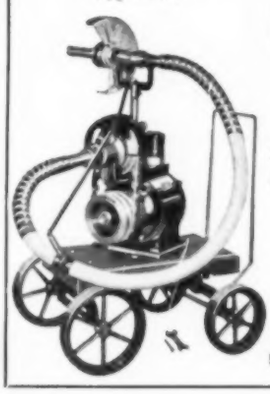

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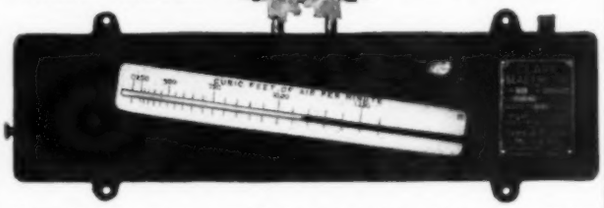

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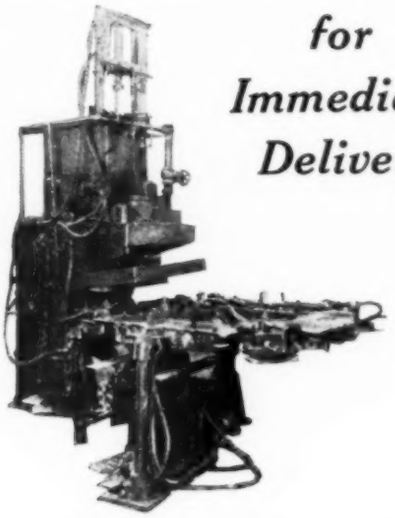

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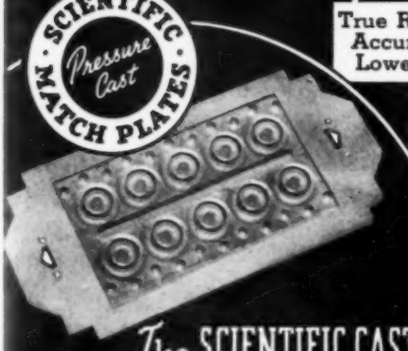

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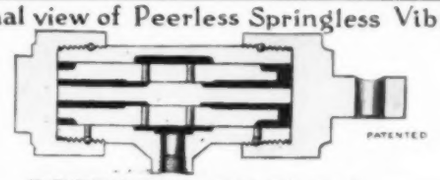

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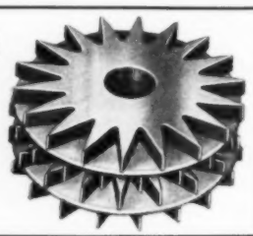
Canadian D. S. Mfg. Co., Hamilton, Ont.



ELEMENTARY FOUNDRY TECHNOLOGY

Edited and Revised by Edwin Bremer and Pat Dwyer

This completely revised second edition, is a text designed primarily for foundry apprentices and practical students of foundry operations. 375 pages, 6 x 9—Index—132 Illustrations—16 tables. *Price* $3.00 *Postpaid.*

THE PENTON PUBLISHING COMPANY
Penton Building — Book Department — Cleveland, Ohio
555-F

FREE Sample Offer

■ Enough to flux 500 lbs. of metal. You will be the sole judge of its merit (dozens of users praise it highly.) Four types available: 1—Aluminum; 2—Brass and bronze; 3—Gray Iron; 4—Monel, Nickel Silver alloy irons. Send for your sample today—no obligation.

BIG FOUR FLUX CO., 1914 PLEASANT RUN PKWY., INDIANAPOLIS, IND.

Classified Advertising

Help Wanted

ATTENTION SALESMEN!

Representatives now calling on foundries regularly are wanted by a well-known manufacturer of high grade line of plumbago, facings, parting, blacking, core wash and allied foundry items. Liberal commission basis. Please advise territory covered, lines now handled, experience with foundry items, etc. Address Box 217, THE FOUNDRY, Cleveland.

PATTERNMAKER

Would like to contact an A-1 patternmaker to run his own shop, in conjunction with a growing nonferrous foundry. Must be willing to move, be able to figure own work and knowledge of some business ability. Address Box 206, The FOUNDRY, Cleveland.

BRASS FOUNDRY FOREMAN WANTED

Experienced in plumbers brass goods, production foundry. Good opportunity for hustler. State full information and salary desired in first letter. Address Box 204, The FOUNDRY, Cleveland.

SALES ENGINEER

Acquainted with core and mold practice in all types of foundries to demonstrate and sell our line of binders and facings. Must be located in the East and have car for traveling. Give full particulars, age, experience, technical training and salary expected. Applications held in strict confidence. Address Box 216, The FOUNDRY, Cleveland.

EXPERIENCED SALESMAN

On core oils and core and mold washes, must have foundry following. State experience and territory covered. Address Box 224, The FOUNDRY, Cleveland.

WANTED

Metallurgist with foundry experience for nonferrous foundry. Address Box 210, The FOUNDRY, Cleveland.

Help Wanted

WANTED

To supervise malleable foundry operations as general foundry foreman. Experienced man with success record. Scrap control talent important—not responsible for pattern, core, annealing or finishing operations. State education, experience and salary desired. Communications strictly confidential. Our foundry organization knows about this advertisement. Mid-west location, not in a large city. Address Box 227, THE FOUNDRY, Cleveland.

WANTED

Foundry foreman, medium sized jobbing foundry, located in South; green sand and dry sand; must be competent green sand molder and familiar with cupola practice. Give age, full experience, references, and salary expected to start. Address Box 228, THE FOUNDRY, Cleveland.

GENERAL FOREMAN

Not over 45 years old for small jobbing brass foundry in Pittsburgh. One with practical experience in aluminum, bronze and manganese bronze. The right man has the opportunity of becoming part of the firm. No investment necessary. Give full particulars including past record, photograph and anything that will help us decide on you. Replies will be in strict confidence. Address Box 230, The FOUNDRY, Cleveland.

Positions Wanted

FOUNDRY FOREMAN OR SUPERINTENDENT

Practical foundryman, past fifty, health excellent. Twenty-two years superintendent. General jobbing, medium and heavy machinery, green and dry sand, cupola practice, semi-steel, high test and alloyed castings. Mix by analysis. Good rigger. Free to travel. Address Box 151, THE FOUNDRY, Cleveland.

MANAGER OR SALES MANAGER

Thoroughly experienced technical foundryman who can handle your complete foundry executive end and make profits. Malleable or gray iron. Twenty-five years as successful operating head. Address Box 193, THE FOUNDRY, Cleveland.

Positions Wanted

PATTERNMAKER

Varied experience in mill, railroad, woodworking, bottling machinery, jobbing experience. Carnegie-Tech. graduate in foundry practice. Snappy, neat, accurate. Will produce. Married. Age 33. Sober. References. Ohio or Pennsylvania preferred. Address Box 184, THE FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Desires to make a change. A good all-around man on all classes of work. General jobbing or production. Good executive. Cupola expert. Practical molder and patternmaker. Address Box 179, THE FOUNDRY, Cleveland.

SALES REPRESENTATIVE

Experienced foundryman and estimator will represent good iron foundry in New York City and vicinity. Also qualified to act in advisory capacity. Address Box 914, THE FOUNDRY, Cleveland.

GENERAL FOUNDRY FOREMAN

Twenty years foreman, heavy or light jobbing, machine and tool castings; cupola practice. Well up in foundry practice, good handler of skilled and unskilled men. New Jersey Preferred. Best of references. Address Box 916, THE FOUNDRY, Cleveland.

METALLURGIST

Experienced in control and supervision of technical operations in gray iron and malleable foundry production. Versed in melting, molding, tests, and analysis. Satisfactory results guaranteed. Address Box 157, THE FOUNDRY, Cleveland.

FOREMAN

With twenty years experience in general jobbing work, gray iron, heavy and medium, green and dry sand, brass and aluminum, copper, bronze. Free to travel anywhere as a working foreman. Efficient, hard worker. Address Box 113, THE FOUNDRY, Cleveland.

Classified Advertising

Positions Wanted

FOUNDRY FOREMAN

Desires position in gray iron shop. Experienced in machine work and ingot molds. Address Box 177, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Started as a molder's apprentice at fifteen. Learned molding, coremaking, cupola melting, etc., the hard way. Now past fifty. Last 25 years in supervisory positions in gray iron foundries, making a wide variety of castings, hand and machine molded, by skilled and unskilled men, in jobbing and production shops. Competent and dependable. Available on reasonable notice. Prefer personal interview. Address Box 214, The FOUNDRY, Cleveland.

PATTERNMAKER

Good mechanic, experienced laying out patterns and flask equipment for production work. Responsible checking of patterns, competent to make contributions toward standardization of gating. Address Box 218, The FOUNDRY, Cleveland.

SUPERINTENDENT OR MANAGER

Thorough knowledge in all departments of steel foundry. Twenty-five years experience, large or small castings, electric or open hearth furnaces. Address Box 156, The FOUNDRY, Cleveland.

EXECUTIVES AND STOCKHOLDERS ATTENTION!

Registered engineer having many years experience in all types and phases of foundry operations desires change. Best references. If interested in better management and higher dividends, write Box 142, The FOUNDRY, Cleveland.

POSITION WANTED

As MANAGER or FOUNDRY SUPERINTENDENT by one who has had years of experience in the business and is competent to successfully operate any foundry. Wide experience in the production of machine tool, automotive, hydraulic and diesel engine castings, turbine casings, general jobbing work light and heavy. Practical molder and patternmaker. Reliable estimator, good rigger, cupola expert. Can produce all alloy and high test irons. At present is employed. Address Box 180, The FOUNDRY, Cleveland.

GRAY IRON SUPERINTENDENT

Thorough experience light and medium heavy castings, jobbing and production, green and dry sand. Expert cupola practice. Mix by analysis. Address Box 155. The FOUNDRY, Cleveland.

MELTER

With twenty five years experience in acid and basic practice desires position. Sober, steady and dependable. Capable of taking full charge of melting department. Best of reference. Address Box 129, The FOUNDRY, Cleveland.

CAPABLE GRAY IRON FOUNDRYMAN

Twenty years as superintendent. Medium and heavy high-grade machinery castings, green and dry sand, semisteel and alloyed. Practical molder and coremaker. Mix by analysis. Address Box 183, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT, GRAY IRON AND MALLEABLE

Forty-one years old. Twenty-five years practical foundry experience, sixteen as foreman and superintendent. Estimate from blueprints. McLain graduate. Light and medium castings. Jobbing or production. At present employed in modern shop, automotive castings. Address Box 186, The FOUNDRY, Cleveland.

FOUNDRY EXECUTIVE

Technical graduate, 34 years of age. During past four years employed as foundry superintendent. Practical experience in all foundry departments of medium and light gray iron and malleable work. Desires connection with well established firm. Address Box 143, The FOUNDRY, Cleveland.

NONFERROUS SUPERINTENDENT

TECHNICALLY TRAINED AND PRACTICAL EXECUTIVE. SPECIALIZE IN PRESSURE CASTINGS. KNOW ALL MIXES MELTING EQUIPMENT. CLOSE SUPERVISION GIVEN ALL DETAILS OF FOUNDRY. ADDRESS BOX 131, The FOUNDRY, CLEVELAND.

Positions Wanted

I WISH TO BECOME ASSOCIATED WITH A HIGH CLASS ORGANIZATION THAT IS EXACTING WITH REGARD TO THE ABILITY AND CHARACTER OF THE MAN IN CHARGE OF THE FOUNDRY DEPARTMENT.

Are you looking for a man—

who knows how to rig jobs quickly and efficiently

who can operate a shop so that production schedules are maintained

who is thoroughly acquainted with all types of modern production machinery including molding machines and core blowers, and can supervise their installation

who can accept and fulfill complete responsibility for the proper functioning of the equipment in the shop

who commands the respect of his men and inspires them to maximum efforts

who is accustomed to doing BIG THINGS in a BIG WAY. I have been connected with three of the most efficiently operated foundries in the country.

Answers can be replied to in person.

Address Box 209, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT OR FOREMAN

Thirty-four years old. Experienced 13 years as foreman and superintendent in large production gray iron foundry. Well versed on cupola, sand, patterns, and all foundry equipment. Desires work in enamelware or furnace castings but not essential. Married. Good references. Available on short notice. Address Box 220, The FOUNDRY, Cleveland.

WORKS MANAGER OR STEEL FOUNDRY SUPERINTENDENT

A successful operator having a keen analytical and practical approach to steel foundry operations in detail, who can increase your production and decrease your costs without additional capital investment. A technical man with practical experience. Address Box 219, The FOUNDRY, Cleveland.

BRASS FOUNDRY FOREMAN

With practical experience in high pressure valves, jobbing or production work, and in all nonferrous metals desires a position. Able to take complete charge. Address Box 100, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT

Practical and technical experience in all departments of light and medium gray iron and malleable work. Well versed in conveyor production as well as floor work. Desires connection with well established firm. Address Box 223, The FOUNDRY, Cleveland.

METALLURGIST

Now employed in responsible position desires change. Experienced in acid open hearth and electric furnace operation, supervision of heat treating and flame hardening department and chemical laboratory. Address Box 225, The FOUNDRY, Cleveland.

FOREMAN OR SUPERINTENDENT

With 25 years experience in centrifugal, brass, bronze, iron or steel. Free to travel anywhere as a working foreman or superintendent. Efficient, hard worker. Can furnish best of references. Address Box 211, The FOUNDRY, Cleveland.

CLASSIFIED RATES

Position Wanted: 5c per word, minimum $1.50; Help Wanted: 6c per word, minimum $3.00. All other type advertisements: 10c per word, minimum $3.00. Copy should be received not later than 13th of month preceding date of issue. Address: The FOUNDRY, Penton Building, Cleveland.

Positions Wanted

FOUNDRY SUPERINTENDENT

Eighteen years experience brass, bronze and aluminum in high production and jobbing. Also can operate wood and metal pattern shop. Know modern cost systems and computing metals, and giving estimates of cost. Address Box 201, The FOUNDRY, Cleveland.

STEEL FOUNDRY MANAGER OR SUPERINTENDENT

Executive with initiative and valuable experience in open hearth electric and converter carbon alloys, manganese, heat acid resisting steels, heat treating rolls, heavy and light castings, also centrifugally cast. Expert in high pressure castings and ordnance work, mechanical and metallurgical engineer. Technically trained practical molder, expert in efficiency, production, sand control, heading and gating, and rigging of molding machines for maximum production lowest cost. Exceptional ability handling men. Twenty-eight years experience. Energetic, modern, progressive. Address Box 213, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT OR FOREMAN

Have had 20 years experience in gray iron, semisteel and nonferrous work. Wish position as foundry superintendent or foreman. Fifteen years executive duties. Have been through all branches, from helper to superintendent. Mix by analysis. McLain graduate. Have handled work from ¼-lb. to 20-tons. Best of references. Address Box 202, The FOUNDRY, Cleveland.

FOUNDRY SUPERINTENDENT-METALLURGIST-CHEMIST

Twenty years experience in automobile and jobbing cast iron foundries. University graduate in metallurgical engineering. Practical experience in cupola and electric furnace practice, molding, coremaking, sand control, gating, risering and metallurgical control. Address Box 205, The FOUNDRY, Cleveland.

SUPERINTENDENT

Age 42. Reliable. Nineteen years with one concern making castings for automobile industry. Twelve years as superintendent. Good references. Address Box 226, The FOUNDRY, Cleveland.

Employment Service

ATTENTION FOUNDRY OWNERS

Write or wire us for technically-trained practical foundry foremen, superintendents, production managers, chemists, metallurgists, core foremen, cost clerks, salesmen, patternmakers, melters (electric, open-hearth, converter and cupola). No charge. McLAIN'S SYSTEM, INC., 804 Goldsmith Bldg., Milwaukee, Wis.

GRAY IRON FOUNDRY POSITIONS

Gray iron foundrymen seeking employment are invited to file their applications and experience records with us free of charge for placement in positions as foundry managers, superintendents, metallurgists, chemists, time study, and foremen in molding, coremaking, cleaning, wood and metal patternmaking departments. Please give full details regarding present and past experience in first letter. Gray Iron Founders' Society, Inc., 1010 Public Square Bldg., Cleveland, Ohio.

SALARIED POSITIONS

$2,500 to $25,000

This thoroughly organized advertising service of 30 years recognized standing and reputation, carries on preliminary negotiations for positions of the caliber indicated above, through a procedure individualized to each client's personal requirements. Several weeks are required to negotiate and each individual must finance the moderate cost of his own campaign. Retaining fee protected by refund provision as stipulated in our agreement. Identity is covered and, if employed, present position protected. If your salary has been $2,500 or more, send only name and address for details.

R. W. BIXBY, INC.

101 Delward Bldg., Buffalo, N. Y.

Foundries For Sale

FOR SALE

LARGE FOUNDRY PLANT in southeastern Pennsylvania, fully equipped and in operation, with room for expansion, industrial and shipping center. 35,000 square feet foundry floor space, can accommodate 150 molders, equipped machine shop, 300 feet railroad siding, complete sprinkler system. Address Box 222, The FOUNDRY, Cleveland.

Classified Advertising

Foundries For Sale

FOR SALE

Nonferrous foundry and pattern shop located in Central Indiana. Population forty thousand; employing twenty men. Gilt edge customers, business making money with constant repeat orders. Oldest shop in city, valuable reputation, discounting all bills and good credit. Shop well located. Prefer selling business and equipment, not real estate. Wonderful opportunity for one or two hustlers. Owner retiring, will gladly assist new owners. Address Box 212, The FOUNDRY, Cleveland.

FOR SALE

Small foundry, 40 x 60 feet, built in 1936, with 32-inch cupola, 7 h.p. American blower, small coreroom and oven. Equipment complete. Also machine shop, 50 x 100 feet, equipped for agricultural machinery. Both located 50 miles from Detroit in good community. $6000 to close estate. Terms. Also can offer a going foundry with machine shop sixty miles from Detroit. **Irving Allen, 1825 Dime Bank Building, Detroit, Michigan.**

INDUSTRIAL PLANT

FOR SALE

Tampa, Fla.

Foundry and machine shop, land, buildings, and equipment. Operated by lessee under lease expiring in Dec. 1940.

Write P. O. Box 871

Tampa, Fla.

FOUNDRY FOR SALE

Completely equipped cast iron foundry, ready to operate. Modern buildings. Sixteen acres of land. Good railroad facilities. Excellent location. For further information, wire, phone, or write.

Mansel L. Rankin
Conemaugh Iron Works
Blairsville, Pa.

Wanted-To-Buy

WANTED

2-3 reverbatory revolving FURNACES, oil-heated equipment, capacity minimum 5 tons. Also water jacket BLAST FURNACE, capacity minimum 15 tons in 24 hours. Box 799, 1474 Broadway, New York.

We Want SANDSLINGERS

We are in the market for used **sandslingers.** State type, year, condition and bottom price for immediate acceptance. Address Box 207, The FOUNDRY, Cleveland.

WANTED TO BUY

Electric steel melting furnace, either 500 lbs. or 1000 lbs. per hour. Address Box 221, The FOUNDRY, Cleveland.

MIXERS WANTED

Used Simpson Intensive Sand Mixers. State size, condition and lowest cash price for immediate acceptance. Address Box 578, The FOUNDRY, Cleveland.

For Sale

REBUILT USED EQUIPMENT

Molding machines, all types; tumbling mills; furnaces; cupolas; air compressors; hoists; rammers, all types; ladles, all types; sand mixers; sand blast tanks; core machines, etc. All equipment rebuilt and guaranteed. All sizes used steel flasks.

HAYNES FOUNDRY EQUIPMENT COMPANY
326 Eleanor St. Kalamazoo, Mich.

FOR SALE

Osborn No. 561 jolt strip, 36" x 48", 4,000 lbs., 12" cylinder, 12" draw. Excellent condition. Also flask equipment for same.

THE ATWOOD MACHINE COMPANY
STONINGTON, CONN.

For Sale

FOR SALE

HINES ALUMINUM SLIP FLASKS

SIZE 11 X 30,	KOPE 6", DRAG 5",	8 FLASKS
SIZE 24 X 10,	KOPE 7", DRAG 4",	5 FLASKS
SIZE 10 X 23,	KOPE 5", DRAG 4",	2 FLASKS
SIZE 12 X 28,	KOPE 7", DRAG 5",	3 FLASKS
SIZE 11 X 19,	KOPE 5", DRAG 4",	3 FLASKS
SIZE 11 X 18,	KOPE 5", DRAG 4",	4 FLASKS
SIZE 14 X 20,	KOPE 6", DRAG 5",	1 FLASKS
SIZE 11 X 16,	KOPE 7", DRAG 3",	28 FLASKS
SIZE 14 X 14,	KOPE 5", DRAG 6",	4 FLASKS
SIZE 14 X 13,	KOPE 5", DRAG 5",	3 FLASKS
SIZE 13 X 18,	KOPE 6", DRAG 3",	1 FLASKS
SIZE 10 X 18,	KOPE 5", DRAG 3",	2 FLASKS
SIZE 13 X 15,	KOPE 5", DRAG 4",	1 FLASKS
SIZE 13 X 13,	KOPE 5", DRAG 3",	1 FLASKS
SIZE 14 X 17,	KOPE 6", DRAG 2",	1 FLASKS

OHIO IRON & METALS
2369 Consaul Street Toledo, Ohio

FOR SALE

Complete set of aluminum patterns for grates to fit American Radiator boilers, new and old style, Arcola and Parlor Arcola. Address Box 137, The FOUNDRY, Cleveland.

FOR SALE

Two Universal sand riddles in perfect condition, price seventy dollars each.

Wandkey Pattern & Foundry Co. Inc.
Anderson, Indiana

FOR SALE

One Jeffrey Sanditioner. Bought new at the Chicago Foundrymen's Show, May, 1940. Only slightly used. Cost new $857.00 at factory. Good as new. Make us an offer. **Windsor Foundry Corporation, Windsor, Vermont.**

SUBJECT TO PRIOR SALE
UNUSUAL OPPORTUNITY

ALMOST NEW—COMPLETE ELECTRIC 36 x 42 AMERICAN WHEELABRATOR TUMBLAST with Tum Blast Loader; Large size dustube dust collector; Motor driven blower; All piping, etc. **MUST SELL QUICKLY—SAVE CONSIDERABLE** Address Box 229, The FOUNDRY, Cleveland.

SPECIAL FALL BARGAINS

Sand blast generators—Macleod and Pangborn.

2—Sand blast barrels "New Haven" 36" x 46".

Cupolas: Whiting 66" shell with rotary blower.

1—30" shell for ¾ to 1 ton capacity.

1—"Blystone" core sand mixer No. 1 size.

Crane ladles, top pour, 1-2-4-8 tons capacity.

Core machines, Wadsworth No. 2 and No. 3 sizes.

Compressor, 12¼ x 10, "American" 355 CFM

Air receiver, vertical style, 42" x 7'. For 100 lb.

Furnaces: Hausfeld barrel type 2000-lb. cap.—Hausfeld 400-lb. non crucible.

Stationary types for No. 50, No. 70, No. 275 crucibles.

Hausfeld Tilting Aluminum, Siliminite lined for 300 lb. size pot, oil or gas fuel. "Booth" electric 825-lb. capacity with transformer.

Dings magnetic separators: 1—type "M," size 2. 1—type "O" size 3. 1—type "M" size 3.

Molding machines: Osborne No. 404 jolt stripper, No. 401 Osborne jolt, rollover draw, Osborne No. 180 stationary jolt, squeeze, stripper. Arcade No. 2 modern portable, hand operated rollover, draw with underneath flask carriage. 2 Adams 48" wide hand squeezers, stationary. Several stationary air squeeze Tabor and Arcade makes.

Besley disc grinder double end 18". Size No. 10.

Maxon premix style furnace blowers, G. E. centrifugal, Spencer, Buffalo, Sturtevant, Roots-Connersville, etc. Send blower specifications.

Dust Exhausters: Steel plate or Cast Iron, belt or motor drive, **hundreds in stock,** all sizes for duct work or otherwise.

Dust arrester: Cyclone type with stand, 5' dia.

Portable core oven, 5 shelves, Hill & Griffith.

25 h.p. Fairbanks-Morse type Y oil engine.

2—"Sly" water cinder mills 1" thick shells.

Thirty Years Fair Dealing With The Foundries

CLIFTON MACHINERY CO.
1023 West 6th St. Cincinnati, Ohio

For Sale

FOR SALE

Subject to prompt acceptance, we have a 36" x 60", 1¼" plate, tumbling barrel; condition good, other than main gear. This includes housings, bearing, cover and clamps; also, clutch. We are holding this at $200. Original cost was $850. Address Box 208, The FOUNDRY, Cleveland.

CARBONS
For Welding Machines
While they last

¾" x 12" Copper Cored—$30.00 M
7/16" x 6" Copper Cored, Copper Coated $15.00 M

EDWARD H. LOEB
4737 Ingleside Ave. Chicago

USED SIMPSON SAND MIXERS

One 6' diam. x 28" deep, steel jacket, two 30" x 6" faces, c.i. solid chaser wheels mounted on 4 pedestal legs and countershaft. One 4' diam., No. 1, style C. Address Box 203, The FOUNDRY, Cleveland.

REBUILT
BLOWERS—FANS—EXHAUSTERS

Connersville-Roots positive cupola blowers. Centrifugal blowers for gas and oil burning. Sand blast, grinder and dust exhausters. Ventilating fans.

GENERAL BLOWER COMPANY
406 N. Peoria St. Chicago, Illinois

FOR SALE
1050 Cu. ft. Air Compressor

Chicago Pneumatic type OCB, horizontal duplex air compressor. Two stage. 125 lbs. pressure with 175 H. P. synchronous motor and starting equipment.

DENNY & CLARK
910 No. Marshfield Ave. Chicago, Ill.

FOR SALE

NO. 3 WHITING MODEL B CUPOLA. USED FOR EXPERIMENTAL PURPOSES, NOT OVER 50 HEATS. GOOD AS NEW.

STEDMAN'S FOUNDRY & MACHINE WORKS
AURORA, INDIANA

FOR SALE
American Sandcutter

Liquidating foundry offering five foot machine less motor. First check $500 takes it. Address Box 200, The FOUNDRY, Cleveland.

FOR SALE

One General Electric centrifugal cupola blower, type T-1-4100, ser. no. 4867. Direct connected to G. E. motor 20-24 h.p. Type KT-C, 3 phase, 60 cycle, 440 volt, 3500 r.p.m. In first class condition. Location central Ohio. Address Box 215, The FOUNDRY, Cleveland.

FOR IMMEDIATE DELIVERY

No. 4 Root pressure blower, for motor drive, displacement 13.1 cubic feet per revolution.
No. 8 Hauck lighting torch (hand pump type with tank).
Core oven cars:
One 72" wide x 96" long
11½" wheels
One 52" wide x 72" long
11½" wheels

PRODUCTION MACHINE CO.
Greenfield, Mass.

FOR SALE

Sullivan air compressor type WJ-3—443' complete with motor and receiver.

JOSEPH BEHR & SONS, INC.
Machinery and Industrial Equipment
Rockford, Illinois

FOR SALE

Four (4) Type LFA Used Detroit

Rocking Electric Furnaces

350 lbs. capacity per charge each. Complete with 150 KVA, 4000 x 90 V. Kuhlman transformers, ¾ h. p., 220 V. 3 Ph. 60 Cy. motors for rocking, with both automatic and hand controls. Manually operated, remote control oil switches. 3000/5 amp. Sangamo watt hour meters, 3000/5 Hickok watt meters and current transformers.

No Reasonable Offer Refused

Address Purchasing Department

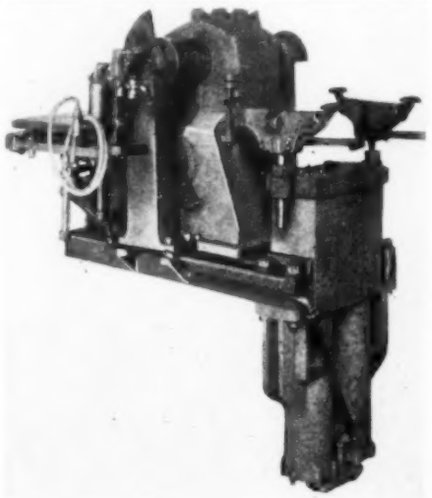
PITTSBURGH EQUITABLE METER COMPANY
Pittsburgh, Pa.

"SCULLY - JONES" RECONDITIONED FOUNDRY EQUIPMENT

♦ Ready for immediate shipment, this equipment has been completely rebuilt in our modern machine shop. Prices on request.

INTERNATIONAL MOLDING MACHINES

International Type "F" comb. jar ramming, power turn-over and draw, 43—25", jolt cyl. dia. 14", 5000 lbs. cap. @ 80 lbs., table 43 x 72".
48 x 16" draw Type "F"—4200 lbs. cap. @ 80 lbs., table size 48 x 83".
37 x 16" (adjustable draw, can be set to max. of 25") Type "F" table size 34 x 70", 3800 lbs. cap. @ 80 lbs. press.
31 x 16" draw, Type "F" table size 31 x 60", 2500 lbs. cap. @ 80 lbs. pres., with roll-off table and air equalizers.



INTERNATIONAL TYPE "F" (Enclosed Model)

27 x 12" draw Type "F", 1400 lbs. cap. @ 80 lbs. press. (enclosed cyl. type).
26 x 8" draw Type "F", 900 lbs. capacity @ 80 lbs. pressure.

GRIMES—MILWAUKEE

Grimes Model K-614 roll-over, 6" cyl. 1000 lbs. cap. @ 80 lbs. max. width of flask 32" max. length 48"—14" pattern draw.
No. 832 Milwaukee hand jolt and roll-over, foot draw, portable, 30" height pattern table, max. draw 8" 15 x 32" table.

OSBORN ROLL-OVER

No. 405, flask cap. 50 x 64"—18" draw 3000 lbs. cap. @ 80 lbs., with run-out Mold Car.
No. 403, flask cap. 44 x 36"—12" draw, 1400 lbs. cap. @ 80 lbs. with swing-out Mold Table, Power Roll-Over.
No. 403-W, flask cap. 52 x 36"—12" draw, 1300 lbs. cap. @ 80 lbs. with swing-out Mold Table.
No. 405-S jolt stripper, jolt cyl. 12" pattern draw 18" jolting cap. 2500 pounds, stripping cap. 2200 lbs. @ 80 lbs. pressure, 19 x 57½" table.

JOLT STRIPPERS

Osborn No. 449, 21 x 22" table, portable, 8" draw, jolt cyl. dia. 5" jolting cap. 650 lb.
No. 26 Davenport, portable, 20 x 20" table, 8" draw, 750 lb. jolting cap. strip pin centers 22 x 22¾".
No. 24 Davenport, stationary, 24 x 24" jolting table, 8" draw, 1500 lb. stripping cap. strip pin centers 24 x 27".
International Type "TJ" 16 x 16 x 10" draw, comb. jolt ramming, power strip.

JOLT SQUEEZE STRIPPERS

No. 142 Milwaukee, stationary, stripping cap. 1200 lbs. @ 80 lbs. press., draw 6" table 19 x 35"—open end type.
No. 152 Milwaukee, portable, max. pattern draw 6", pattern length 28" width 20", 1200 lbs. cap. @ 80 lbs. press., 22 x 30½" table.
International Type K-3, portable, 13" dia. squeeze cyl. 38" between rods, 5" draw.
Osborn No. 333, jolt roll-over squeeze pattern, 9" jolt cyl. 19" squeeze cyl. flask cap. 45 x 36"—11" draw, 14,000 lbs. cap. @ 80 lbs. pressure.

JOLT SQUEEZE STRIPPERS (Cont'd)

No. 703-6 Osborn, 21 x 28" table, stationary, length of opening in lifting frame 34", 6" pattern draw, 1000 lbs. jolting capacity, flask length 44½" with roll-off conveyor.
No. 82 Osborn, 46" between rods, 10" draw, 19" squeeze cyl. jolting cap. 1200 lbs., stripping cap. 1000 lbs., 24 x 36" table.

JOLT SQUEEZERS

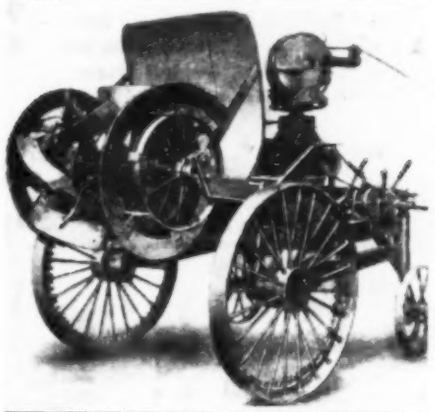
International "JS" 9-32" portable, table top, also "JS"—10-32" portable.
No. 103 Milwaukee, stationary, 17 x 21" table, 10" dia, squeeze cyl. jolt cyl. dia. 4".

PLAIN AIR SQUEEZERS

Osborn No. 74-W 33" straddle type, 15 x 18" table, portable.
Tabor stationary, 36" between rods, 18 x 26" table, 13" dia. cyl.
Tabor, 35" between rods, 20 x 26" table, stationary heavy duty type.
Nicholls Type "B" post type, 10" dia. cyl. with base, 5" steel pipe air reservoir, 15 x 15½" table.

SIMPSON MIXERS

No. 2 Simpson, 6 ft. dia., double mullers, single pulley drive.
No. 2 Simpson, 6 ft. dia., heavy duty type 9" face Mullers complete with 25 HP 220/440V AC Motor, double gear reduction, High Type Legs.



AMERICAN SAND CUTTERS

American Model "HP" size 56, 48" cutting cyl. 56" between tractor wheels, with 2—220V AC Motors.
Model "AA" size 72, 60" cutting cyl. 78" between tractor wheels, 4" face, 10 HP 220V AC Motor, Cable and Take-Up Reel.
Model "AA" size 72, 62" cutting cyl. 68" between wheels, 10 HP AC Motor, cable and take-up reel.
Type "K" sizes 72, 60" cutting cyl. 72" between wheels, with Buda Engine.
Model "F" Type 112-92, 4 motor type, 80" cutting cyl. 440V AC Cleveland Motors.

TUMBLERS

Set (2) 24" dia. x 48" long, 14 x 29" door opening, Superior, back to back, clutch and tight pulley drive, renewable trunnions.
30" dia. x 48" long ⅜" plate, door opening entire length of barrel, renewable trunnions, T&L pulley drive.
30" dia. x 60" long ¾" plate Sly, renewable trunnions, door opening entire length of barrel, T&L pulley drive.
36" dia. x 48" long 1" plate Whiting, door opening entire length of barrel, pulley drive.
36" dia. x 72" long 1¼" plate Whiting, late type door fasteners, door opening entire length of barrel, renewable trunnions, helical gear.

1500 FT. ROLLER CONVEYOR

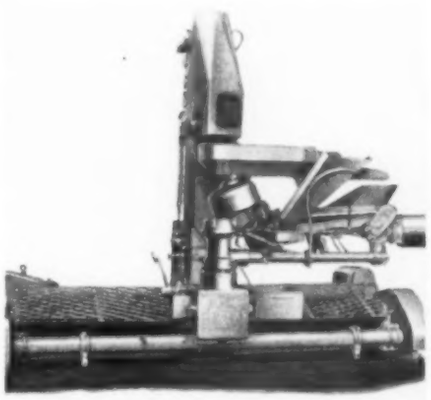
20" wide, 4" centers 3¼" dia. rollers.

OVERHEAD ELECTRIC TRAVELING CRANES

P&H 10-ton 48' 5" span, cab cont. 4-motors 220V DC (with 5-ton aux. hoist) drum type cont.
Whiting 7½-ton double "I" Beam Type, 24' 2" span, equipped with 2—7½ 3-25-220V Motors, trolley hand racked, floor operated.
Whiting 5-ton 100 ft. span, 3 motors, Westinghouse Series 230V DC, cage control, distance from trolley rail to high point on trolley 3' 6½".
Whiting 5-ton 54 ft. span, 3 motors, Westinghouse 230V DC, cage control.
Shaw-Box 5-ton 38' 10" span, Shaw-Box 220V DC Motors, cage cont.
Euclid, 5-ton 33' 10" span, 3-motors, 220V DC, cage cont.
Toledo 5-ton 31' 7" span, type of girders 20" "I" Beam, 6" face, cab control, GE 115V DC Motors.
Bedford 5-ton 28 ft. span, 220V DC motors, cage operated, 36" trolley rail to high point on trolley.
Shaw-Box 5-ton 27' 6" span, cage control, structural truck ends, fish belly type girders, Shaw-Box 220V DC Motors, 4—15" chilled iron wheels.
Northern Engr. 5-ton 24 ft. span, 25 ft. lift, 3 motors, Wagner Elec. 220V AC.
Whiting 5-ton TRANSFER CRANE, cage oper. 18' 6" span, 3 motors 220V AC with 2-motor Shepard Monorail Hoist 20 ft. lift, 2-part single rope.

ELECTRIC HOISTS

Cleveland Electric Tramrail, 1-ton, floor cont. equipped with 3½ HP 110V DC Motor.
Shepard 2-ton stationary, with cont. equipped with 20 HP GE 220V AC Motor, 60 ft. lift, with remote control.
Shepard 2-ton Monorail Type for 10" "I" Beam, 2-motors 110V DC, 18 ft. lift.
Harnischfeger 3-ton with Double Trolley, hand racked, 6 HP 220V DC Motor, 15 ft. lift.
Detroit Type "HR" 5-ton, hook type, with 5 HP 220V DC Motor, floor cont. 12 ft. lift, speed 11 FPM.
Shepard 10-ton, bolt suspension type, with 15 HP GE 220V AC Motor, with 40 ft. of cable grooved to handle 34 ft. lift, with two sheave wheels for four ropes.



BEARDSLEY & PIPER TRACTOR TYPE SANDSLINGER

Tractor Type, 7-10 cu. ft. cap. 16" head 5 ft. jib, 4 ft. arm, 440V AC Motors, push button.
Portable Type (hook attached) 6 ft. jib, 4 ft. ramming unit, ramming cap. 7-10 cu. ft., with Screw and Bucket Elevator, 220V AC Motors.
Type "S" stationary (can be moved with overhead crane) 6 ft. jib, 4 ft. ramming unit, 7 ft. ramming cap. with 2—220V AC Motors.

Above items represent but a portion of our used or reconditioned FOUNDRY and INDUSTRIAL EQUIPMENT BARGAINS . . . Send for our CURRENT LIST NO. 68 with SUPPLEMENT, which shows our COMPLETE STOCK on hand at our CHICAGO WAREHOUSE and ready for IMMEDIATE DELIVERY

SCULLY-JONES & COMPANY

(Foundry Division) 19th & ROCKWELL STS.
PHONE LAWNDALE 8770 — CHICAGO, ILLINOIS

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